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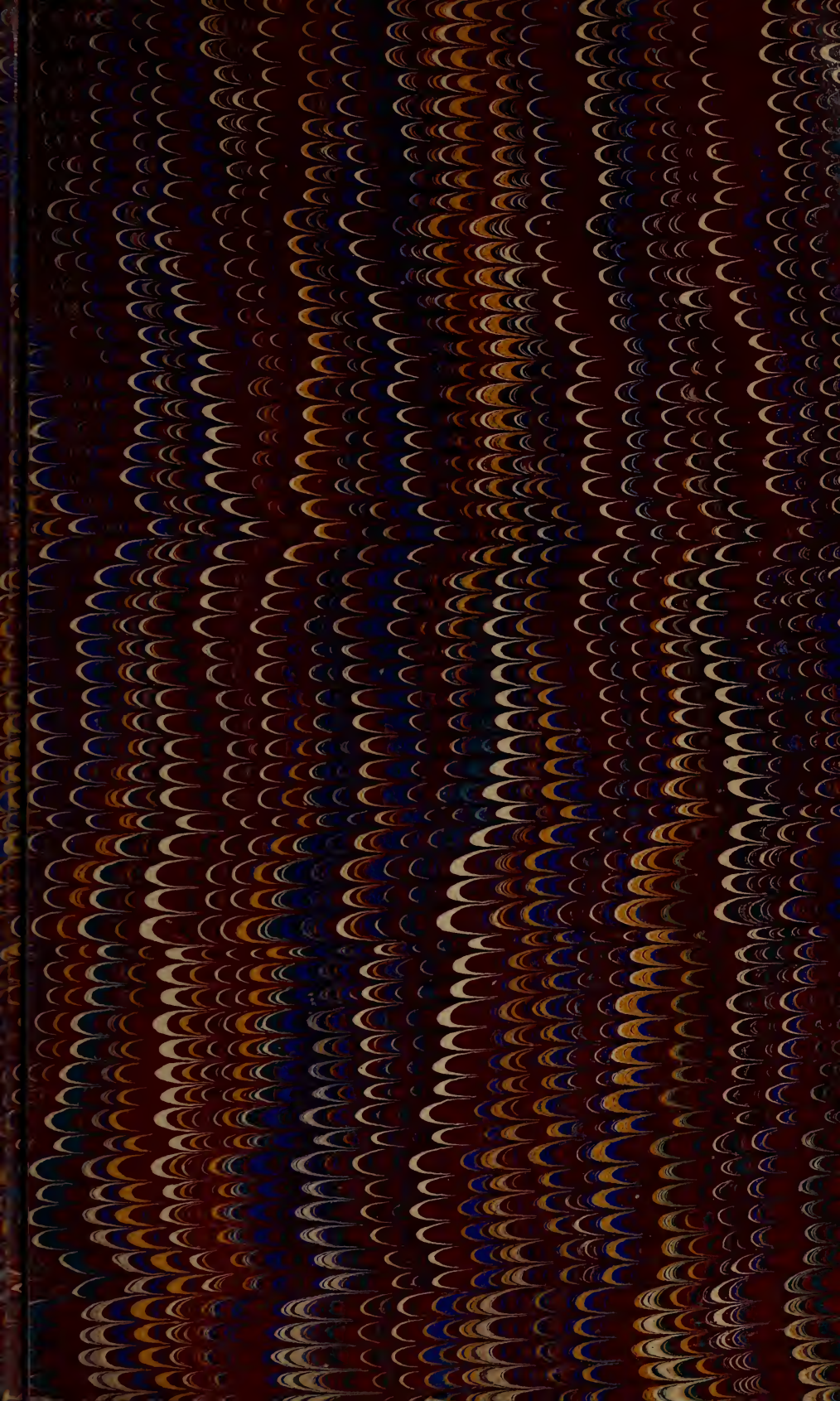
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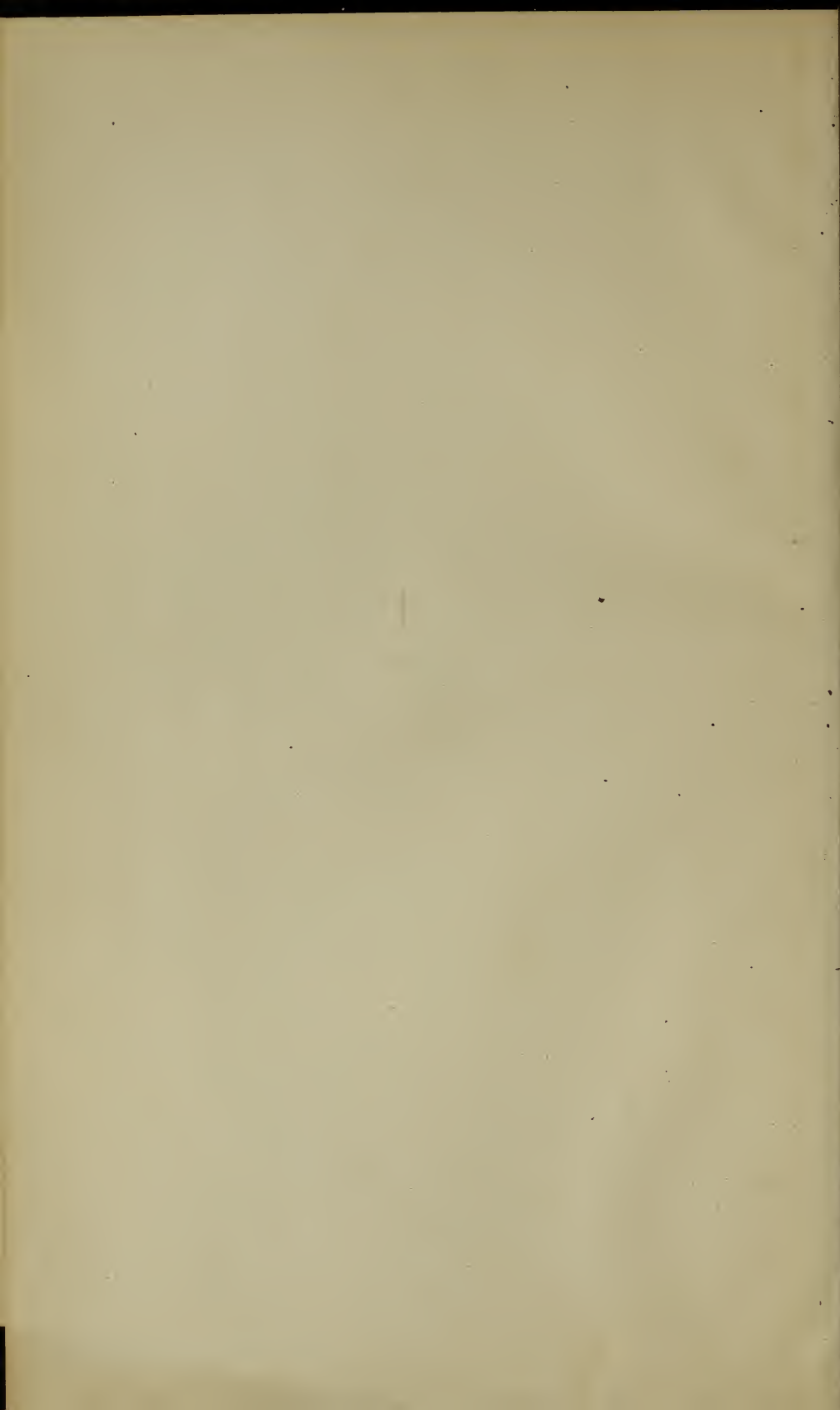














THE  
DENTAL COSMOS:

A  
MONTHLY RECORD OF DENTAL SCIENCE.

*Devoted to the Interests of the Profession.*

EDITED BY  
JAMES W. WHITE, M.D., D.D.S.

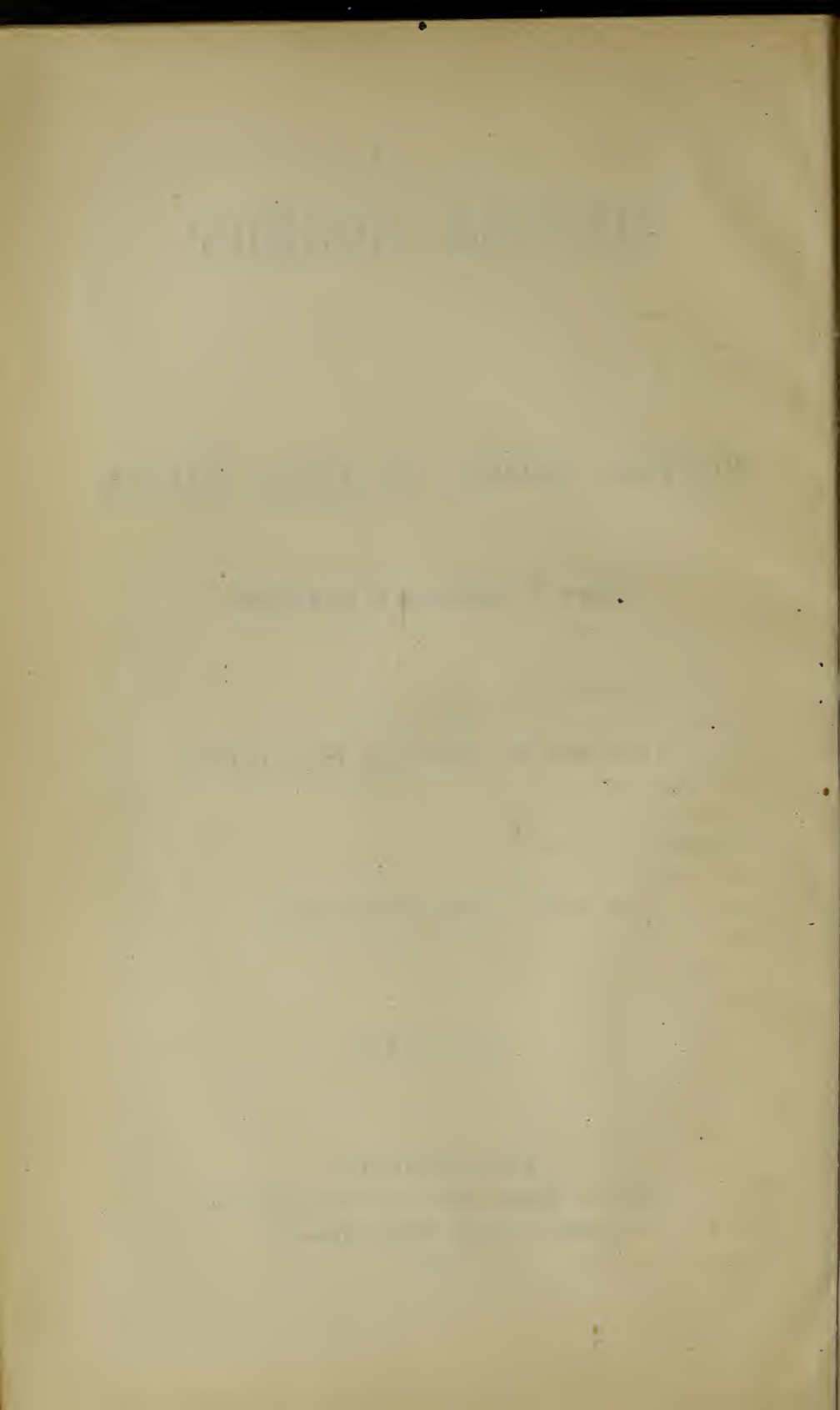
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Observe, Compare, Reflect, Record.

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VOL. XXIII.

PHILADELPHIA:  
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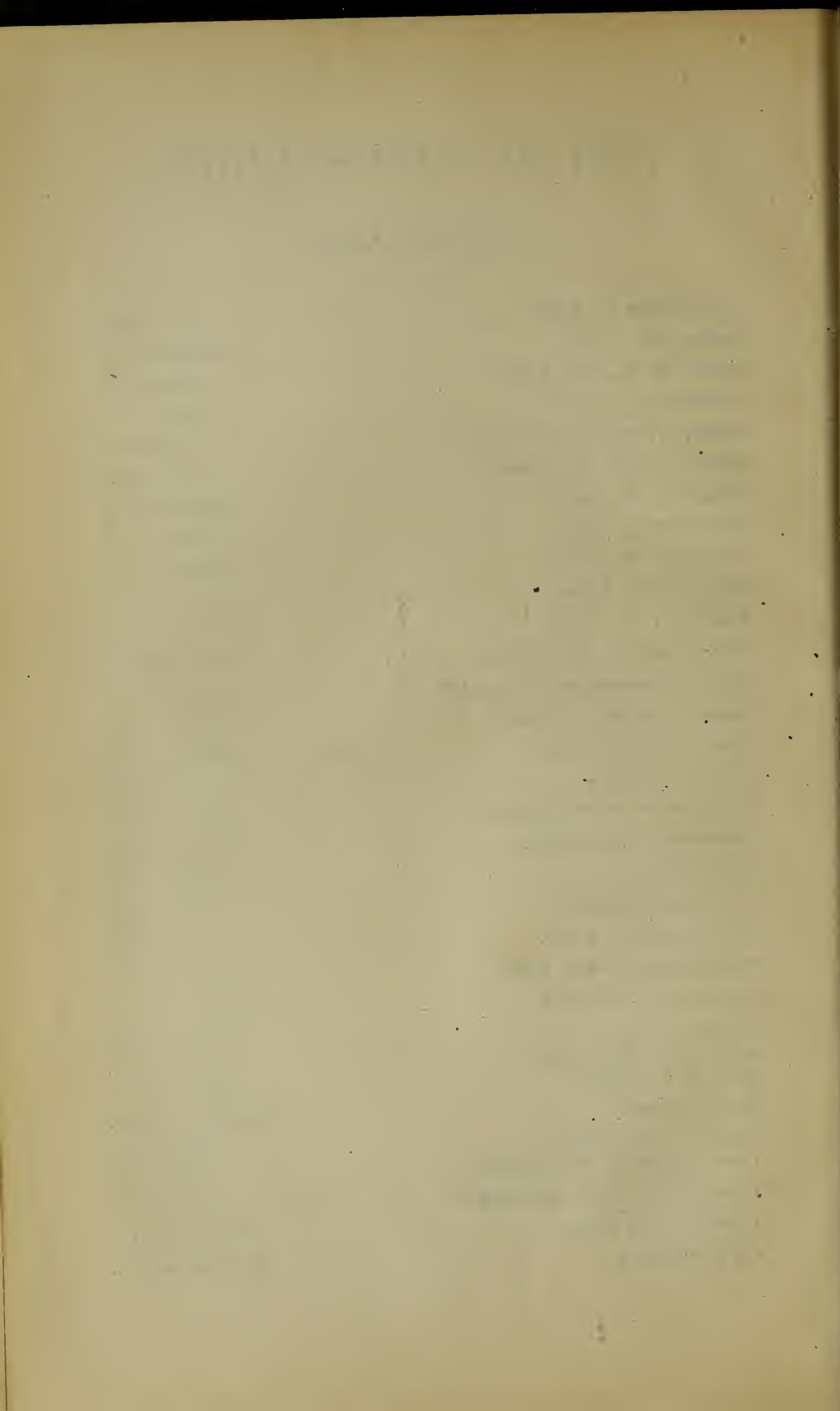
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THE

# DENTAL COSMOS:

VOL. XXIII.

PHILADELPHIA, JANUARY, 1881.

No. 1

## ORIGINAL COMMUNICATIONS.

### CLIMATE, FOOD, AND ASSOCIATIONS IN THEIR RELATIONS TO TOOTH-STRUCTURE.

BY JAMES TRUMAN, D.D.S., PHILADELPHIA, PA.

(Read before the Odontological Society of Pennsylvania, November 6, 1880.)

THE prevalent idea that teeth vary according to climate, food, etc., is probably a very true one, and needs no argument at this late day to advocate or refute it; but to what extent this variation takes place in teeth, more than other tissues, is not clearly indicated. In fact it is a subject encompassed with difficulties. Dentistry is too young and the trained workers too few, and the statistics collected from professional sources too meager, to arrive at any definite conclusions. It is therefore only possible to skim over the surface and, perhaps, glean a few facts, leaving the results to the future for that correction which must necessarily come from more positive observation. That climatic influences have largely to do with the formation of tissue is axiomatic, and would seem to need no words to make it more self-evident, but the processes by and through which this is effected are by no means so clear. They enter into the realms of mysterious influences that operate to evolve life from the minutest atom to the fully-developed animal; from the unorganized protoplasm to the almost Godlike mentality of man. Until we can define what the correlation of forces really means; until we can fathom the mysterious border-land, which no microscope has ever penetrated, we must grope in profound darkness. Here, observation ends and theory begins, and yet behind this theory, in the illimitable void, lies the true home of the forces, which, aggregated, create life and life-forms wherever we find them. The most powerful forces are the intangible. We call the fall of bodies to the earth the force of gravitation. We recognize the fact that the universe is held in position by a power invisible and incomprehensible to the human intellect.

The world of causation lies beyond our present reasoning powers or our most powerful objectives. We recognize certain effects, but the causes are shadowed in the realms of mysterious life.

Whether we view life in the concrete or examine it in its simplest forms, we are impressed with the fact that the laws of formation are everywhere imperiously present, and that atoms, organized or unorganized, are but the creatures of influences which, through all apparent aberrations, are resolved finally into harmonious relations. While we may formulate the law into words and say, evolution is progressive development, we are met at the beginning of our inquiry by apparent contradictions,—contradictions which the few thousand years accorded us for observation have failed to clear up. The apparently unchanging color of the different races of men, and their typical forms, continuing through successive ages, have never been satisfactorily traced to climatic influences or differences in food and surroundings. The world has rested content with the explanation that the color of the negro was the result of tropical heat through countless generations, but it is somewhat difficult to reconcile this statement with the facts of history and observation. The effect of color was supposed to be largely dependent on the degree of distance from equatorial regions. This theory is met by the equally difficult fact of the existence of light-shaded men in the interior of Africa, and from that other long- and well-known fact that the coppery tinge is common to races in temperate zones. The negro appears to be a distinct type, and cannot be confounded with any of the other tropical races. It may be argued, with some degree of plausibility, that if he is the result of climatic influences, then, by the same influences, other races, similarly circumstanced in regard to heat, should have been similarly formed; but they are wanting in many of his attributes of color, form, etc. The North American Indian indicates by his color his probable Asiatic origin, for there is nothing in climate to cause the tinge, else would two hundred and more years have given some evidence of change in our own race. But if change exist at all, it has been on the side of improvement, and the American of to-day—in the North—has less color than the races from which he sprang. Yet the negro of the present is the negro of all history. When Assyria was in its glory he was a factor in its civilization, and lives to-day in its ruined temples. When Egypt was young, Africa was evidently old, and the Nubian of the nineteenth century is the Nubian of a period of which only the records in stone are left. We can recognize this coloring of races from the negro to the pure Caucasian, but we are left stranded on the shoals of inconclusive data, in bays to which no rivers lead, in results which, however closely followed, are traceable to no absolute



cause. If climate produced in uncounted ages a negro, it should in similar periods undo its work under more favorable circumstances. The records of observation are too limited to solve this problem. So difficult is it to reconcile facts with the theory of evolution, that men like Agassiz have not been able to accept it, but have clung—perhaps unreasonably—to the old and equally difficult theory of distinct creations. While admitting the force of the argument that no perceptible change has occurred in history, written or unwritten, in the color of man as regards races, we do know that the color deepens by exposure to tropical suns; and this, through successive action of generations, ought to produce a result as intense as that of the negro. There should be some evidence of value in this respect found in the Spanish races that have peopled the tropical regions of this continent, but, unfortunately, they are of too mixed a character to be worth anything as a basis for inductive reasoning.

Without entering into this line of argument further, it is very clear that the surroundings to which animals and men have been subjected have had much, if not all, to do with the various productions that we witness. Probably no instance on as large a scale in modern times has occurred as the changes that have taken place in our own country. The time is short,—barely more than two centuries,—and yet the American type is as fixed and as marked as any of the older races of the world. It is said, and with truth, that we are a mixed race; but, making due allowance for this, there is a certain undefined and undefinable appearance that marks our race, as it marks all races. The American form is as distinct from the German stock, from which it in the main sprung, as it is possible to imagine. Who can fail to observe the square shoulders and broad hips of the Teuton and not draw comparisons favorable to the sloping shoulders and graceful lines of the form of the American-born? These are marked distinctions, and strike the eye at once. They demonstrate what I regard as a fact, that slowly, but surely, we are growing a type of men and women that in time will be a distinct race, grafted on old stocks, but molded by climate, food, natural associations, and the law of harmonious development into a class,—whether superior or inferior, at least widely different from all others.

That this change cannot go on century by century without having its legitimate effect on the teeth as well as other tissues is self-evident. They are apparently an evolution from lower growths. The histological features of the human teeth are but a modification of those of inferior animals, changed by conditions and the uses to which they are to be applied. The importance of the teeth in the study of form has been recognized since the time of Cuvier, who dis-



placed the old mode of study of habits and external surroundings by that of the study of organs, and by this means was able to determine, with probable exactness, the general characteristics of an animal from a single tooth. This was subsequently greatly simplified by Bichat, who regarded the tissues composing organs as of vastly more importance; and it is this latter view that has led up to some of the most important discoveries in natural history, and upon which Agassiz based his celebrated classification by which, as Buckle expresses it,\* "fossil ichthyology for the first time assumed a precise and definite shape." The same author further remarks (*loc. cit.*): "Another discovery of which the application is much more extensive, consists of the striking fact that the teeth of each animal have a necessary connection with the entire organization of its frame, so that, within certain limits, we can predict the organization by examining the tooth. This beautiful instance of the regularity of the operations of nature was not known until more than thirty years after the death of Bichat, and it is evidently due to the prosecution of that method which he so sedulously inculcated." While it is possible to build up an extinct animal into form from a single tooth, it is equally possible, in reverse order, to designate approximately, from a given climate, flora, etc., the probable teeth necessary for animal life. The conditions that we know existed in prehistoric ages were adverse to anything but coarse developments. It was impossible for organic life to be molded into the finer forms of subsequent ages. As the atmosphere yielded up its proportion of elements, the flora developed into new and more refined expressions; and as the flora became refined, animal life assumed new and better forms. The laws of development are so clearly marked in the different geologic periods of the world's life, that the intelligent thinker has but to study them to be satisfied that everything is subject to progressive law, working up from inferior developments. When we adopt the principles enunciated by Bichat, and enter into an examination of the tissues of teeth, we more clearly understand these conditions. The immense molar of the mastodon giganteus clearly indicates the coarseness of vegetable life by the efforts of nature to meet this want, for it is a distinctly-marked tooth, wholly unlike that of its congener that followed it,—the elephant. The large cusps, capped with a thickness of enamel of extraordinary depth, forcibly illustrates the character of food required and the force requisite for its mastication. It is the type of prehistoric immensity, and carries the mind back to a period when the earth was given over to savage forms, and when, if man existed, he too par-

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\* History of Civilization, p. 643.

took of the same degree of coarseness, and the giants of fable may have had a real existence. Reasoning from analogical evidence this must have been the case. Advancing from the mastodon to the elephant, as before observed, the changes are marked. The prominent cusps have given way and the tissues are differently arranged to meet the requirements of mastication. As this refining process has gone on from period to period these coarser forms have either disappeared entirely or have been relegated to those districts of the world's surface that are more nearly allied to the conditions where nature, in the wildness of a prehistoric era, affords them a home and surroundings suitable to build up these gross forms. Thus, without extending the argument, we may assume that there has been a gradual but certain change, and that that change has been the direct outgrowth of climatic conditions. This must precede all other changes. As the variations take place in the proportions of the elements in the atmosphere, a corresponding change is observed in all forms of food, from the vegetable to the animal, and at last the refining process reaches man, and the higher forms of civilization are but the evidences of this progressive development; for, whether we admit the existence of a soul or not, it is clear that the refining process does not stop with the body. In proportion to its advancement from grosser forms is the mind developed, and it assumes phases impossible under a different and grosser diet. The butcher's dog is a name synonymous with savagery, and the first steps to civilize a nation of savages must be through the stomach. Educate our Indian tribes to the use of cereals as a substitute for wild meat, and then there will be a hope of saving the remnant of aboriginal life.

It is a warmly-cherished belief in the Old World that the nobility are of a different blood from the ordinary run of men; and it is this belief that gives them the preponderance of power they possess. In one sense it is true. Surrounded by all the luxuries of a higher civilization, they have developed—a race within a race—of superior mold to the common people, and had the same exact observance of law in all its requirements been adhered to, greater results would have been accomplished. What is true of the nobility is true of all the higher classes throughout the world. It is simply a species of hot-house development of the human body, physical and mental, and may progress with good or ill results in proportion as the development is brought under the control of positive law.

The adaptation of teeth to the peculiar requirements of food is one of the most interesting and instructive facts observed in the study of comparative anatomy. Not only are the forms modified, but the tissues are specially arranged to accomplish desired results.

and where extraordinary strength is required, they are subjected to a further modification. From the lowest form to the highest is this law of adaptation invariably observed. We see it beautifully manifest in that member of the sparoid family, the common sheep's-head (*sparus ovis*), with its cutting incisors, so similar to the sheep from which it derives its name, and used for the same purpose,—nipping the grasses from the bottoms in shallow seas; its rounded molars, formed for great strength and adapted for crushing small crustacea; the extraordinary development of enamel, with its interlacing fibers, giving the greatest power of resistance. Then we follow up the various series through the rodents, with their wonderful, ever-growing incisors, and the effective combination of tissues in the enamel and dentine of varying densities; the remarkable organization of tissues in the ruminant molars; the carnivora, with the series of cutting or tearing teeth; the dog, with his almost human posterior molar that unerringly indicates to the naturalist the possibility of mixed food; and still further on, to the quadrumana, with the almost human series; and finally, our own order, the bimana, with its unbroken series, in which mixed food is the certain indication. Now, if the law of adaptation has effected these changes in the past, it must be conceded that any changes in condition or food would equally produce the same results now or at any future time, or, in other words, a law established remains a law throughout all ages. It is clear, therefore, that if we admit that formation and growth depend on the necessities of the individual or individuals, there is a possibility that the coming ages may witness great changes in the development of tooth-structure, in harmony with the progress made in other portions of the economy. Whatever views may be entertained in regard to the theory of evolution, the assertion cannot be successfully controverted that the teeth of our own class have made most remarkable changes in form if not in structure. From the Australian savage, perhaps the most degraded of his order, with his square jaw, prominent canines, increased size of the series, and an altogether close resemblance to the higher quadrumana, up to the highest civilization, we find that progressive development depends on the refining influence of climate, food, and surroundings. It is doubtless true that if we advance by law we can retrograde by law, or, in other words, if teeth have changed through the developing processes of the ages, it is possible that by a change of conditions they may revert to the original type, for the possibility of advance carries with it the possibility of retreat. This tendency to a retrograde metamorphosis is ever present. It is manifest peculiarly in our own teeth in the three-rooted superior bicuspid, two-rooted inferior, and the frequent exhibition of double



roots in the six anterior teeth and the occasional increase above normal number in those of the molars. While it is not likely that the law of change will carry, in reverse order, to the origin of our class, it is nevertheless a striking proof of kinship to a lower order.

While not prepared to assert, as has been asserted, that Americans are fast tending to a condition when the *dentes sapientiæ* will become mere rudimentary appendages, it must be acknowledged that there is a change in form greater than in other nations in a very large proportion of our population, and not confined to any special locality. That such a condition exists is very clear, but it is not so clear that it indicates a permanent change. That there are causes at work to produce temporary deviations from original types is evident, and while a variation may become a fixed form in generations, there is no positive evidence that it is more than an exceptional result of an exceptional cause, and that in due process of time the original type will be resumed. Similar, though not so extensive, variations may be observed in other teeth, notably the lateral. In sections of our country that have been settled for long periods and among classes whose habits of life have been fixed for generations, these abnormal presentations are not so frequent.

The early history of our country is a history of labor; a history of change from the barbaric elements to a measurably perfected civilization. The growth from forest and prairie to cultivated farms and great cities has been accomplished in a comparatively brief period, and at the expense of the physical, to a great extent. Such changes could not have been accomplished without producing extensive atmospheric disturbance, and this, in its turn, acting on the human organism, has tended to temporary disorganization. That this is true can, I think, be clearly demonstrated in all sections of our country settled within a limited period, and the effects have not been wholly outgrown in the more developed regions. If the stigma that Americans have the worst teeth in the world be true, though I do not regard it as a fact, it is evident that as the causes producing anatomic defects are removed there will be a return to original types, and by hereditary laws these will be made permanent. It is a favorite theory of the people of the older settled portions of the world that the American race is fast degenerating. But this theory has no foundation on fact; indeed, statistics clearly demonstrate not only a superior degree of health in all the thoroughly cultivated portions, but also show that longevity is on the side of this country.

While acknowledging the fact that the admixture of races tends to irregularity in the dentures, it can only be regarded as a temporary lesion that will be overcome through the changes before



spoken of, in which type-forms are arranged by the inevitable laws of growth. It may require generations to bring about the balance in development, but that it will come is as certain as that natural processes always tend to perfect harmony of structure, and sooner or later accomplish it.

While food is without doubt the most important factor in the changes evident in tooth-structure, it has not, in my judgment, the influence generally ascribed to it. The evidence clearly indicates that the teeth of man developed in tropical climes are equally as perfect in structure and form as those who dwell in Arctic regions and consume a greater quantity of carbonaceous matter. And this observation holds good throughout all changes of temperature. An extended examination of the skulls of all nations, from the extreme of heat to the extreme of cold, and from the lowest savage to the most cultivated civilized race, leads to the conclusion that the nutrition of these organs proceeds, under all varieties of food, to the same end. The very finest dentures I have ever examined have been those of the South Sea Islanders; and almost equally as good have been developed in the most northerly tribes. I am now considering structure, and not caries. That comes under entirely different laws, and must be separately discussed. I am aware that the examination of dentures long deprived of their life-force is in some degree liable to lead to erroneous conclusions, but after eliminating all causes of error, the fact still remains as stated. If it be conceded that all varieties of climate, food, etc., tend to the same general result, then it becomes a question whether we can materially affect tooth-structure by the presentation of inorganic materials for assimilation. The laws governing nutrition are but little understood, and I am not prepared to advocate or refute the favorite idea of some that the density of structure can be increased by a forced nutrition in the life of an individual. That this can be accomplished through the slow but refining processes of inferior organisms must, I think, be clear. It must be acknowledged that while climate, food, etc., have marked effects on form and structure, they cause no material change in density, except of a temporary character; that as development proceeds in harmonious relationship with the various changes, it follows as a natural result that any localized interference will find an equilibrium as these temporarily destructive forces are eliminated. This applies, however, only to the action of a certain general law, and not to the special destructive effects witnessed in caries. There must be a broad distinction made between caries, the result of imperfect structure, and that occasioned by other causes. It is a comparatively easy thing to map out here a place and there a locality where caries progresses with

marked rapidity or with extreme slowness, but if the condition of structure be not regarded as a factor, the observations are valueless, if by them it is intended to prove that the teeth of one section are predisposed to caries and those of the other free from it. When it is asserted that one class is more liable to caries than another, it does not necessarily follow that that class has more imperfectly-developed teeth than the other which is less affected. It simply means that the progress of caries is mainly due to causes above and beyond mere structure. Its progress depends, first, on the density of structure; and, secondly and mainly, on a myriad of external and possibly entirely local causes. The opportunities afforded me for observation in Europe lead to the positive conviction that climate acts only in the mode and to the extent previously stated, and is only one of a legion of influences that operate to weaken structure, and that while a deleterious climate may prove destructive, a good or an equable one is no preservative from the effects of caries.

The general idea, before alluded to, that the teeth of the Americans are especially bad, is only partly true, and is confined to structure. Throughout Europe the ravages of decay are in far greater proportion, and not from any intrinsic defects in the teeth themselves, but from absolute neglect. A superficial observation would at once decide that conditions there were exceptionally bad, leading to weak formations. But this would be very far from the truth. Taking the German teeth as a standard for judgment, I have no hesitation in asserting that the structure, as a rule, is better than ours, but I do not regard the average quality as equal to our kinsmen in England. Opportunities have not been afforded me to judge of other nations to an extent warranting an opinion. While I have formed a favorable judgment of German teeth as to quality, there are large contiguous sections where this opinion could not be sustained,—sections where, if I were to judge from the general appearance and mental characteristics, I should suppose that some of the difficulties attending our own development had been theirs. As an illustration, that portion of East Prussia formerly part of Poland is occupied by a people remarkably diverse in all their characteristics from the Germans. Living in the same degrees of latitude and with a climate not markedly dissimilar from other parts of Prussia, they yet have mental and physical organizations very different. With finely-organized nervous structures one would look for brilliancy of intellect, and this is the rule with the educated classes, but it is accompanied by a weakness of tooth-structure very similar to the worst forms of our American teeth. This opinion coincides with that of intelligent American dentists who have labored among this

class for a series of years. A thorough knowledge of the interior life of this subjugated people, present and past, would be necessary to draw any philosophical conclusions. Magitot\* acknowledges in his discussion of the marked differences of various parts of French territory in respect to their liability to caries, that the reason for this difference is not very clear. While denying the possibility of inheriting caries, he recognizes the fact that anatomic peculiarities come under this law, and seeks an explanation from this source. After discussing the food and drink question he writes: "We have already remarked upon the influence of race in the question which occupies us, and it seems evident that we must have recourse to considerations of this nature to explain the various tints the chart † offers us.

"In consulting the documents collected upon the ethnology of France, particularly the remarkable work of M. Broca, we recognize that the best-preserved vestiges of the two principal races that have peopled our soil are represented in our chart by opposite tints. Thus, the Celtic race, included in the region of Brittany, is marked in white; the other white region is still correspondent with an agglomeration of Gallic peoples,—a central Celtic region. On the other hand, if we regard the black tract crossing France from the northeast to the southwest, without taking account of some intermediary tints of no importance, we find that this direction is precisely that followed by the Cymric invasion which entered Gaul about the seventh century before our era and left such lasting traces. Now, to the well-defined contrasts separating these two races,—Celtic and Cymric,—we think there should be added the circumstance of numerous cases of caries, through the primitive defects of dental constitution. . . . The constant apposition of tints conducts us to this conclusion: that the population of France is divided, in a general way in regard to dental caries, into two great families,—the Celtic family has small and stocky individuals, with a hardy dentition; the Cymric family has large, blonde individuals, whose dental organization is defective." While I would hesitate to question so high an authority, it would seem as though this statement is based more on theory than actual observation. Mere tables, whether compiled by individuals or governments, when they detail simply results, are only of moderate value. It proves nothing that a certain number of individuals lose more teeth than a certain number of others differently located, or that more teeth of a certain kind are habitually lost than others. It demonstrates nothing to

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\* Treatise on Dental Caries. Chandler's translation, p. 79.

† Chart of the Distribution of Dental Caries in France (*op. cit.*).



say that more of the wisdom teeth are lost than of the second molars, more of the superior laterals than the centrals, and more of the bicuspid than either, or that the first molar is the most predisposed tooth to caries of the series. It simply means, with the exception of the latter, that these teeth are more subject to local influences than the others; and in the case of the first molars, it is a question whether these have not more to do with the destruction so common than even defective structure. In this country, where opportunities for observation on various races are more extended than in any other, it has been observed that, even with the exceptional good character of the teeth of the Celtic race, they rapidly succumb to influences found here. Whether these are to be looked for in climate or in food, or whether both combined produce a change in the secretions, is still an open question. The solution of this, it seems to me, must be found in local disturbance that finally ends, by the hereditary laws before spoken of, in anatomic defects, which in turn, by the same law, reproduce under better conditions more perfect dentures.

Nations become, through generations, a condensation of the conditions by which they are surrounded; in other words, man is so much atmosphere, so much food, so much association, and, in time, so intimate does this relationship become, that any diminution of these particles is just so much towards starvation. Deprive the body of its accustomed nutrition and just to that degree it withers and fades. We are accustomed to believe that man is the most readily acclimated of all animals. We mean by this, that he can accustom himself to any variations of climate; but, while this is in part true, it is true only as regards atmospheric changes. Those other elements that enter into life are not so readily accommodated, and it requires a long series of years to accomplish it. My experience abroad leads me to the conclusion that every American born has to undergo a process of slow starvation there, and that not because he or she cannot eat the food, but because it fails, measurably, to afford nutrition. While the German will flourish on his brown bread and coffee, the American starves on the best *ménu* of the hotels. So universal is this that a comparative state of health can only be maintained by change. My own experience and that of every member of my family was that, whether the food was prepared well or ill, palatable or otherwise, there was always a feeling on rising from the table of a system unsatisfied. A distinguished physician of Leipzig remarked to an American patient, "You Americans cannot live in Germany; you are all starving for something in the air or food not obtainable here." In time, of course, a change is effected, and then the man or woman becomes, to that



extent, a German, and loses the pure American type, and this is greatly increased in his children. The proof of this assertion is all around us. A very superficial examination of the children of German parents amply demonstrates it. In many cases the pure German type is lost in one generation. What is true of the German is equally true of all others. Herbert Spencer\* remarks that "When a dweller in marshes lives in an atmosphere which is certain death to a stranger; when he sees that the Hindoo can lie down and sleep under a tropical sun whilst his white master, with closed blinds and water-sprinkling punkahs, can hardly get a doze; when he sees that the Greenlander and the Neapolitan subsist comfortably on their respective foods,—blubber and macaroni,—but would be made miserable by an interchange of them; when he sees that in other cases there is still this fitness to diet, to climate, and to modes of life; even the most sceptical must admit that some law of adaptation is at work. Nay, indeed, if he interprets facts aright, he will find that the action of such a law is traceable down to the minutest ramifications of individual experience. . . . This universal law of physical modification is the law of mental modification also." An interesting field is open for future observation in regard to the changes in teeth of those who have kept the race pure. There is one that ought to give rich results, but one to which I have had only limited access,—the Jewish stock. Close observation here in different countries would enable us to arrive as near as we will probably ever be able to do to the proportionable influence on teeth of climate, food, and surrounding associations.

The thoughts I have thrown together lead, perhaps, to no conclusions. In the contracted limits of a paper it is impossible to elaborate them with the clearness desirable, hence I regard them as merely suggestions,—simply a step in the direction of an elucidation of that mysterious process we call nutrition. If civilization be a process of destruction to the dental organs, then it follows that it cannot be limited to these but must embrace the entire organism. But I am not prepared to admit this as a fact, though nations, as individuals, seem to have a limited period for youth, maturity, and old age, before final death. The subjects I have endeavored to treat are as broad as humanity, and enter into the deepest and most sacred relations of life. To us, professionally, belongs one specialty, that of conserving the teeth. This it is our highest duty to know scientifically, and to draw philosophical deductions from facts is our province, and thus, as teachers, perform our part to lead the people on to higher estimates of the duties and responsibilities of our new

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\* Social Statics.

life, that we may become a distinct people, with the foundations so surely laid, that out of fragmentary nationalities we may become a composite whole, a nation destined and worthy to lead the civilizations of the earth.

## DENTAL PATHOLOGY AND THERAPEUTICS.

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(Continued from vol. xxii., page 576.)

WHEN these occur they are almost invariably due to asthenic inflammation of sthenic tissue, as in typhoid, or to sthenic inflammation of asthenic tissue, as in cases of intense irritation from decidedly putrescent pulps of large size in teeth of adynamic patients.

Under such circumstances inflammation continues in despite of all efforts to relieve, until an amount of cacoplastic lymph has been effused which causes hard swelling of great extent. The face is misshapen, the eye nearly closed, the cheek or neck discolored to reddish purple, the jaws almost tightly shut, and the sufferer becomes demoralized. By well-directed treatment these conditions at length assume a much more favorable aspect; the face is almost natural in contour: the swelling of the eyelid is much diminished; the purplish hue has passed from cheek or neck; and the motion of the jaw is very nearly normal.

And yet there exists a "lump," greater or less in size; more or less hard: more or less accurately defined: more or less tender to touch; but none the less "a lump." This is alike unsatisfactory to patient and practitioner. The removal of this "lump" or "induration" is technically termed its "discussion."

These "indurations," viewed from the purely dental stand-point, are of three grades: *first*, those which are easy to discuss; *second*, those which are difficult to discuss; and, *third*, those which it is impossible to remove except by operation.

*First.*—*Those which are easy to discuss.* In cases of this first grade we find natural aid from one of two things: either the peculiar form of inflammatory action has been due to a depressed condition of a system which is normally vigorous, and which, by ordinarily well-directed treatment, is promptly recuperative, or it has resulted from an irritant of such large proportions that its removal is sufficient to produce notable cessation of interference with physiological action. It is therefore needed that but little more should be

done in order to secure that absorption which shall restore normal contour.

For such an induration, if it is completely within the mouth and upon the gum, I have found no other stimulant to absorption better than ground ginger, and no other method of applying it easier than by a small, *thin* bag. One of these little applications worn constantly, except while eating or sleeping, will generally soften the induration quite perceptibly in from one to two days, and completely remove it in from four to six days. It is noteworthy that this form of appliance adds to the merely medicinal effect of its contents the adjunctive absorbing power of *pressure*, than which few, if any, of the means for discussing indurations are recognized as being more potent.

If indurations of this first grade are not entirely within the mouth, but present external tumefaction, the addition of a daily anointing with the iodide of potassium ointment of the pharmacopœia will so aid the inside treatment as more promptly to secure a perfect result. It is sometimes recommended to use the tincture of iodine, or a mixture of this with olive oil; but I regard the unnecessary discoloration of any face as objectionable, to say the least, and for female patients I consider it unwarrantable. Even the iodide of potassium ointment is liable to produce discoloration unless it is nicely compounded, and, on this account, the addition to it of a drop or two of solution of potassium should be ordered as a preventive.

*Second.*—*Those which are difficult to discuss.* In these cases we find ourselves without that aid to which reference has been made—either general systemic depression is persistent, and such demands upon reduced vitality are being made by essentials, that comparatively trifling local lesions are seemingly disregarded; or, notwithstanding the removal of irritation in large amount, the asthenic condition of surrounding tissue and the want of irritability and tonicity generally prevents any attempt at interference with non-irritating organisms. Under these circumstances it is only through decided effort that any effect can be produced, and it is only through continued effort that such indurations can be completely discussed.

It is usually taught that the officinal tincture of iodine should be frequently and freely painted upon the gums for the removal of these tumefactions, but my experience leads me to advise the use of the dental tincture in preference. By using the strong tincture,—

Iodine, ℥ iij.;

Alcohol, ℥ j.,—

the applications can be made much more accurately, much more acceptably, and they are required much less frequently. They can

be touched exactly over the organized effusion, either as one touch, if it be circumscribed and decidedly indurated, or as a number of small spottings, if the induration be more extended and less hard. The strength of the application can also be better defined, for infrequent spottings of small size can be gently made, or more frequent and decided spottings of larger size can be given, as the requirements are proven to be moderate or excessive.

With some patients the use of iodine is not permissible, as the irritation and pain consequent upon any application of sufficient power to effect the desired object is intolerable. With such I have usually succeeded by using the dental ointment of iodide of potassium,—

Iodide of potassium, ℥j. (dissolve in boiling water);

Simple ointment, ℥j.;

Solution of potassium, gtt. ij.,—

spreading it on a small piece of muslin and placing it upon the induration, renewing the application twice or three times daily.

As in the cases of easy discussion, so those of difficulty are sometimes not confined to the inside of the mouth, but are markedly indurated externally. These external indurations are very much more frequently associated with the lower than with the upper jaw; indeed, they are almost exclusively so situated, and this peculiarity may be regarded as the culminating complication of periodontitis of the lower teeth.

For this condition, whatever may be the inside treatment, I would recommend the use of the dental ointment of iodide of potassium, externally, two, three, or more applications daily, according as they are tolerated by the skin; or, if the ointment is disagreeable, that the swelling be painted with a strong solution of iodide of potassium in water,—

Iodide of potassium, ℥ ss. ;

Water, ℥j.

If the tissue about the parts is voluminous, and especially if the induration is diffused and pendulous, the support of a bandage, or even of a bandage and compress-pad, may be required to produce rapid absorption. When I have had occasion to resort to this support and compress I have sometimes spread the ointment upon the pad, or saturated the pad with tincture of arnica and water,—equal parts,—or with the solution of iodide of potassium, diluted. The spreading thus of the ointment precludes the need for more than one, or at most two, applications daily, and the saturated pad is readily kept constantly moist by comparatively infrequent wetting.

Besides these topical applications, it is occasionally required to



utilize the constitutional action of the iodide of potassium. For this purpose from two to ten grains are given in solution—wine-glass of water—three times daily. It is really very gratifying, in obstinate cases, to note the beneficial results which sometimes rapidly follow this combined local and constitutional medication; for I have treated indurations which had resisted most obstinately many weeks of very decided local medication, and have had them soften and completely disappear as the result of twelve or fifteen days' administration of iodide of potassium in conjunction with a continuance of the previous treatment.

*Third.—Those which it is impossible to remove except by operation.* These cases are, of course, comparatively rare, but it does occasionally happen that a resolved periodontitis is left with some encysted remnant of abnormality which, while it gives no present sensation; or even indication of *trouble*, is yet an annoyance from the tangible fact of its existence. It may not be large enough to be deforming, or even obtrusive; it may not be tender, even though pressed upon; it may not increase perceptibly as months or years pass by, and yet it usually does grow some, and this *is noticeable* to the practitioner as it is examined from year to year.

This form of induration is probably most frequently found as "circumscribed" over the buccal roots of superior bicuspid and molars, or as "diffused" over the roots of lower bicuspid and molars. In the upper jaw these indurations are quite universally confined to the inside of the mouth, are imperceptible externally, and are situated near to or at the reflection of the mucous membrane from gum to cheek. The indurations of the lower jaw are quite as frequently perceptible to sight externally as they are to touch internally, and for this reason they are liable to greater manipulative irritation from frequent touching by the patients. This generally eventuates in more decided growth; but, as I have said, the growth is never sufficient to be called "decided," except as viewed from critical observations made at long intervals.

When this form of induration exists, and when from any reason, such as gradual growth, dislike to its presence on the part of the patient, or belief in its easy removal on the part of the practitioner, its discussion has been attempted and the attempt has proved a failure, it becomes one of the gravest questions of dental surgery as to the *best* course to pursue.

If no particular sensation arises from the growth; if its increase is but very, very gradual; if its presence is imperceptible, or but slightly perceptible; if the tooth from which it arises is of any particular value as a masticator, or preserver of contour, or of good occlusion upon the part of other teeth; and if the case can be so

presented to the patient as to relieve all depressing mental emotion concerning it. I should advise *no interference*.

If the increase has been gradually becoming more appreciable; if the "growth" is so apparent as to give rise to any remarks; if slight sensation is the response to pressure; and if the tooth which causes it is comparatively valueless, or, indeed, is not decidedly valuable, I should advise that *it be extracted*.

If, in connection with the peculiarities mentioned in the last paragraph, the tooth is particularly valuable, I should advise the attempt at removal of the induration by operation. In this, as in all the other considerations pertaining to these unfortunate results, great manipulative differences exist between the superior and inferior jaw. The circumscribed character of growths of the upper jaw is favorable to easy and successful operations, while the diffused character of lower-jaw growths renders such attempts difficult and attended with possible failure and probable recurrence of induration. For this reason I advise, whenever it is in any way reasonable, that the discussion of lower-jaw indurations of the *third grade* be accomplished by "removal of the exciting cause,"—i.e., *extraction of the tooth*.

In operating upon indurations of the upper jaw the dental engine has superseded all other instrumentation, for, an incision having been made over the length of the tumor, the lips of the wound are held apart and the substance of the growth is mechanically disintegrated by a few rapid rotations of a bur of suitable size. The *débris* is washed or sponged out, and the parts dressed with tincture of calendula, phénol sodique, very dilute oily carbolic acid (two or three drops to an ounce of water), hamamelis (Pond's or Humphreys' extract), tincture of arnica, or laudanum. The treatment should be energetically antiphlogistic and healing.

It is possible that in some instances the removal of these obdurate indurations may be accomplished by *extraction and replantation of the irritating tooth*; but, although I read of the recorded success of this operation in enormous percentage,—done for various reasons in *hundreds* of cases.—I yet feel that such practice is *not warrantable, even though successful, except under extraordinary circumstances*.

During a practice of over thirty years, and with an extended experience in the treatment of dental disease in its most severe and most intractable forms, I have found it expedient, according to my opinion, to resort to "replantation" in but few more than a dozen cases; and, although over nine-tenths of these have proved such as could be regarded "successful," I have, nevertheless, had experiences of my own, and have been brought into intimate relation with experiences in the hands of professional friends for whose knowl-

edge and skill I have the greatest respect, which have made me exceedingly cautious in attempts of this kind, and *doubly so* in the serious matter of advising its performance by others.

If, however, the exceeding value of the tooth is such as to warrant the experiment of "replantation," its occlusion should be accurately marked upon it with impression-paper and noted; it should then be carefully extracted (doing the least possible violence to surrounding parts), nicely washed, and placed in tepid salt water. Immediately upon the extraction of the tooth, and prior to any work upon it, the alveolus or alveoli should be thoroughly cleansed by syringing with tepid water slightly medicated with tincture of arnica. All possible remains of peridentium, *which not infrequently adheres in sac-form to the cancellated structure which surrounds it*, should be broken up with a hoe-shaped excavator. This should not be neglected, for in many cases such omission may be the only thing which will prevent a rapid and satisfactory cure.

It may, in very exceptional instances of extensive and long-continued indurations, be necessary to bur-drill, somewhat decidedly, the diseased tissue forming the present apical walls of the alveoli, but I regard this as infrequently indicated.

The alveoli having been properly prepared, they should be packed—gently, but firmly—with cotton pellets dipped in either tincture of arnica or calendula.

The extracted tooth being now examined, the condition which has maintained irritation in sufficient degree to induce and promote induration will then be apparent, and will be found to consist of exceedingly thickened peridentium, either upon the ends, sides, or within the forks of the roots; or it may be, of a portion of necrosed root, which, proving insufficient in its encysting to devitalize its immediate surroundings and thus induce suppuration, has yet had more than power to overcome all attempts at absorbing its cyst.

Such portions of peridentium as are found thickened, leathery, or saccular, are to be scraped away or cut off, and the ends of the roots, whether giving evidence of disease or not, should be somewhat filed off and nicely smoothed. Such ends of roots as are found necrosed or denuded of peridentium should be cut off with a small watch-spring saw, and the shortened roots should then be smoothly rounded. It has been suggested that each root of every tooth which is to be replanted should have a canal-like groove chiseled from the neck of the tooth along its entire length to the apex, as an additional guarantee against mechanical irritation from the effusions of reparation. Although I have never tried this, I am so favorably impressed by it that I deem it a duty to mention it.

All teeth of this kind—irritants to third-grade indurations—are



supposed to have been "entered" as thoroughly as was possible while in the mouth, but as it is frequently possible to enter pulp-cavities, and especially canals, with greater facility in teeth in the hand, this entrance should be *perfectly* accomplished before replantation. All tortuosities in canals should be removed by careful drilling, and much more perfect preparation for filling them than could be done previous to extraction should now be indulged in. If the ends of the roots have required such amount of excision as to leave canal openings of large caliber, the remaining portion of the canals should be so enlarged interiorly, and so arched (feather-edged) to the enlarged foramina as to permit a neat closure of these after the tooth has been replanted and has been accepted by the surrounding tissues.

If the diseased peridentium has been removed from the bifurcations of roots, and particularly if this has been found necessary in notable quantity, a fine drill-hole should be pierced *from the pulp-cavity* through to the bifurcation. This is intended for venting this location in case of need, and I was only induced to recognize its advantage by reaping prompt and decided amelioration of adverse symptoms in several instances from making such vents with the teeth *in situ*.

Should it be deemed necessary to make the bifurcation-vent, the drill-hole should be accurately enlarged, taperingly, into the pulp-cavity. The object of this, it will be at once recognized, is to permit of its easy and thorough filling without danger of passing filling material through the tiny opening.

After the tooth is thus thoroughly prepared, the canals, vent,—if it has been made,—pulp-cavity, and cavity of decay or tap-opening, as it may be, should be temporarily filled. For canals with but triflingly-enlarged foramina, I use the taper-twisted, cotton-wool canal-dressing, which I usually employ in practice for my permanent canal-filling, moistening it with oil of cloves for the purpose, merely, of facilitating and insuring an impervious packing. For canals of enlarged foramina I introduce, first, an appropriately-sized pellet of gutta-percha, rolled upon and thoroughly incorporated with the end of a small twist of cotton. This is warmed, accurately placed in position, allowed to cool, and when hard the cotton is packed upon it. The remainder of the canal is then filled with a firmly-compressed cotton-dressing.

Bifurcation-taps are filled with gutta-percha; pulp-cavities, cavities of decay, and tap-openings are also filled with gutta-percha.

The points of occlusion which had been noted should now be so removed by grinding, burring, or filing, as to insure that no immediate irritation shall ensue from the touch of antagonizing teeth.



and the tooth is then again put in tepid salt water until desired for replanting.

The cotton packing of the alveoli should now be cautiously removed, so that the least possible infliction shall be given and the least amount of hemorrhage induced. Should bleeding occur in even slight profusion, it is best controlled by giving one- or two-drop doses each minute, for four or five minutes, of tincture of erigeron, or of tincture of chenopodium album. In these cases I prefer the constitutional administration to the topical use of these medicaments.

When hemorrhage has practically ceased, the moisture should be dried from the alveoli by *absorbent* cotton, a drop of tincture of aconite placed in each alveolus, and the tooth, having been taken by appropriate forceps, should be gently and accurately placed in position. This is usually effected with much ease, but it sometimes requires a degree of force which is surprising. When this is the case it is important that the occasion be taken to insure correctness of position, in doing which the patient should be directed to close the teeth gently at first, and should then be so guided that the final placing of the tooth shall be done with but little pain.

(To be continued.)

### TREATMENT OF APPROXIMAL SURFACES.

*H. C. LONGNECKER, PHILADELPHIA, PA.*

(Read before the Pennsylvania State Dental Society, July, 1880.)

~~In presenting this subject before the society, I would preface my remarks by saying that~~ It is my conviction that the operations required upon the approximal surfaces are by far the most difficult, the most laborious, and, at times, the most discouraging ~~of any we are called upon to perform.~~ Not only are they difficult, but, ~~as a rule, they exceed in number~~ those required upon the buccal and masticating surfaces.

In the treatment of the latter class of cavities, while there may be differences of opinion as to the preparation and manner of introducing the gold, still, if thoroughness be observed, the result will be, as a rule, satisfactory. When, however, decay attacks the adjoining surfaces of the teeth, there are a number of "systems," all of which have been and are still warmly and earnestly defended.

In the treatment of approximal surfaces operators may be divided into two general classes, ~~namely, those who practice the method of making permanent separations, and those who restore the original~~

form of the lost tissue. The first class may be subdivided into those who advocate the single and double V-forms of separation; those who separate widely and freely towards the palatal and slightly towards the buccal surfaces; and, lastly, those who cut through for the purpose of obtaining room, leaving the contiguous walls parallel to each other.

That form which allows the teeth to again come in contact at the necks is a dangerous one, for the simple reason that the cause of the original decay is not removed. Recurrence will, in a large number of cases, take place, and the operations thus made necessary are extremely difficult to perform thoroughly and satisfactorily. That form which allows them to touch towards their buccal and grinding surfaces, while it secures freedom at the necks of the teeth if properly performed, has the objection of causing a sacrifice of tooth-structure, which hardly seems justifiable. In addition to this the teeth are kept in immediate contact, the exciting cause of decay is not removed, and unless conditions are favorable, caries will in due course of time ensue.

The last form spoken of, namely, cutting through from the grinding surface, leaving the walls flat and parallel to each other, has many objections; yet it is probably more extensively practiced than any other method, for the reason that it facilitates operations. If it is done early in life the teeth will again come together, and if fillings have been inserted, that slow but potent force, capillary attraction, will ever and anon be at work, recurrence of decay will, in a large majority of cases, take place. The operator will be forced to sacrifice still more tooth-structure and refill, and, in the natural course of events, he will have a condition the same as if the teeth are frail and the tonic of the system low, even worse than before. Again, the teeth treated in this manner are for a time almost useless for the purpose of mastication,—the food wedges between them, and every act of mastication causes pain or distress. This will continue as long as the spaces remain, or until the gum becomes, so to speak, paralyzed. Even when they do become measurably comfortable, there are few cases where the gum-tissue presents a perfectly healthy appearance. I would also add, that if the dentine be exposed by cutting away the enamel, the surfaces will, for a time, be quite sensitive to thermal changes, & of course the dentine will be subjected to decay.

If separations of themselves will prevent caries, why not practice one or the other of these methods before decay takes place, and thus supersede the possibility of it? If it is of any avail after the teeth are once affected, how much more would it be when the surfaces are still intact! Yet there are few who make separations of whatsoever kind to prevent disintegration upon the adjoining surfaces of the

of decay will not

producing

while

teeth. In other words, anticipation, to my knowledge, is not very extensively practiced.

In speaking of the treatment of approximal surfaces, let us for the present confine ourselves to the molars and bicuspsids, as these are the teeth that perform the service of mastication. It is these teeth more than any others which should be made to touch, not only for the support thus given and the comfort afforded in mastication, but for other reasons, which will be spoken of hereafter.

The first step in performing what is ordinarily known as a contour operation, is to press the teeth apart either by wooden wedges or cotton. Cotton is in many instances preferable on account of its producing less soreness, though it has the objection of not accomplishing the work so rapidly. Having gained the necessary amount of room, gutta-percha should be packed between the teeth and the whole space filled. This should remain three or four days, when the tenderness caused by the wedging process will have passed away. The gutta-percha should then be removed, the rubber-dam applied, and the ~~cavities or~~ cavity prepared. ~~In preparing the cavity it~~ should, in frail teeth, be made to extend beneath the free margin of the gum; it should be opened well from the grinding surface, so that the palatal and buccal walls, when the operation is completed, shall be free; grooves should be cut in <sup>both</sup> ~~either~~ walls, the edges carefully and smoothly prepared; and, lastly, a starting-point should be made at the cervical wall, near either the buccal or palatal groove. A starting-point is preferable, because you can be more positive of a thoroughly moisture-tight joint, at this, the most vulnerable place in the whole operation. The starting-point should be partially filled by a hand-instrument with No. 8 or 16 foil, cut in narrow strips, and in length from a half to one inch. The remaining ~~part of~~ the operation can be performed with ease ~~and facility~~ by the electro-magnetic mallet. The foil, to secure the best results, should not exceed No. 32. Heavier foils may, ~~however, under favorable circumstances, be used.~~

The gold having been thoroughly consolidated and the shape of the tooth ~~perfectly~~ restored, the finishing ~~process~~ can be accomplished ~~readily~~ by means of fine files, emery-cloth, linen tape and pumice, used in the order named. The operation should be completed before removing the rubber-dam, so as to avoid as much as possible the wounding of gum-tissue.

If the adjoining surfaces are operated upon in this manner, the gold of one is made to touch the gold of the other, decay cannot take place here, the margins are free, the force of capillary attraction is overcome, comfort in mastication insured, and, in short, I know of no method that presents so many advantages for the ultimate salvation of the teeth.

*Though sometimes*  
*If the proximal surface of each tooth is filled*



*should not be left*  
*exposure*  
*this*  
 In the anterior teeth it is not so necessary to have them touch towards their cutting-edges. A narrow space is, I think, preferable to the ~~exposing~~ of gold. To avoid ~~showing gold~~ the teeth should be separated by pressure, and the cavity ~~or cavities~~ prepared and filled from the palatal surface. If, however, it is necessary to expose the metal to restore lost tissue, the operation should be performed with the utmost care and finished exquisitely; ~~leaving~~ the teeth angular and square ~~should be studiously avoided~~; the corners should be rounded, and the whole made to present a graceful appearance.

*loc can*  
 The operations ~~here spoken of~~ are extremely difficult, and it is not always ~~that we can work up~~ to our ideal; but it is better to make bungle after bungle, trying to do something, than be propriety personified, doing nothing.

*such*  
 The labor, skill, expense, and time required for ~~this method of~~ operating *will*, I think, be admitted by all, but while these may be, and doubtless are, practical objections, they ~~in no manner~~ *do not* impair the correctness of the principle. These operations represent the ideal—the very poetry of dentistry; ~~they are useful~~ *they are beautiful*. Let us guard the beautiful with reverent care; the useful will take care of itself.

*is considerable;*

## ESTHETIC DENTAL PROSTHESIS.

BY W. WARRINGTON EVANS, D.D.S., M.D., WASHINGTON, D. C.

(Continued from vol. xxii., page 409.)

WE present in this number two practical cases, the originals of which are now being worn in the mouth. They have been chosen on account of their extreme variation of characteristics, and as representative of cases which frequently give much trouble and annoyance to the practitioner in the effort to secure as pleasing results as he and his patients would desire.

The first case is that of a young lady who lost all her natural teeth at the age of twenty-two. She came to me a few months ago with about twenty-three roots, several of them abscessed—all that remained of a once handsome denture. Her health had been seriously impaired by this condition of her mouth, and there was no choice but to remove the *débris* and give her the benefit of prosthetic dentistry. The result has been very satisfactory, she having gained nearly twenty pounds in a little over three months, and having almost entirely recovered from the effects of dyspepsia, to which she had been a martyr. Here was a case in which an artificial denture was an absolute necessity.



Fig. 16 is taken from the models to show the close articulation resulting from the prominent alveolar ridges left by the recent

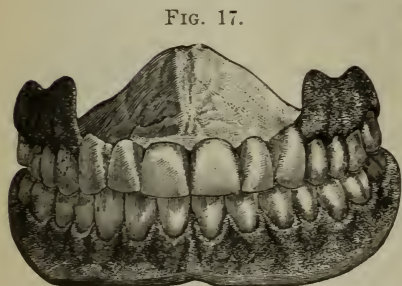
FIG. 16.



extraction of the teeth. The mouth is inclined towards what is termed Lambdoid type,—V-shaped arch, etc.

Fig. 17 represents a front-view of the set of teeth made for this patient. I always try to get an idea, by questioning my patient

FIG. 18.



without letting the object appear, as to what the natural teeth were like,—regular or otherwise,—to assist the judgment which I may form in my own mind from the face, models, etc. Acting on the

information received and my idea of the facial requirements, we have a little protrusion of the upper front teeth, a slight irregularity in the lower teeth, and a little overlapping of the centrals of the upper set by the laterals. The teeth are short and full, the six front ones being set directly on to the gums.

Fig. 18 gives us a side-view of the same, showing more clearly why it was necessary to mount our upper front teeth directly upon the gums: First, because the recent extraction left prominent alveolar ridges; second, because the patient has a short, thick upper lip, which would have been made more prominent, rigid, and unnatural-looking had the teeth been set outside the arch; third, were the lower teeth thrown out sufficiently to meet the upper teeth if these were mounted outside of the arch, the mouth would have presented the appearance of that of an herbivorous animal; and moreover, such an arrangement would have made it impossible to hold the plates in position during mastication.

Fig. 19 shows the models of an old gentleman's case, in which we have exactly an opposite condition of things from the preceding

FIG. 19.



one. A rather full and very flat jaw, the alveolar ridges having been much absorbed and a wide articulation being required to restore harmony of the features.

Fig. 20 is a front view of the set made for this case. It is peculiar, for many reasons. The patient was very eccentric, and being willing to pay liberally for the work, was humored a little. The plate was made of gold, attaching the teeth with celluloid. The teeth are of medium length, some of them represented as slightly exposed at the roots, especially the canines. A slight show of irregu-

larity is made by allowing the laterals to rest behind the centrals. The cuspids are prominent and have rather a broad front. The buc-

FIG. 20.

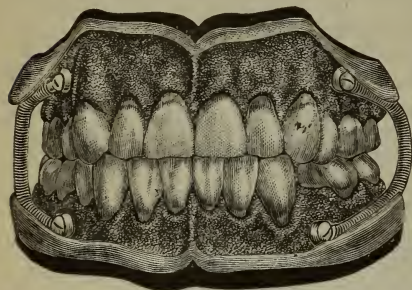


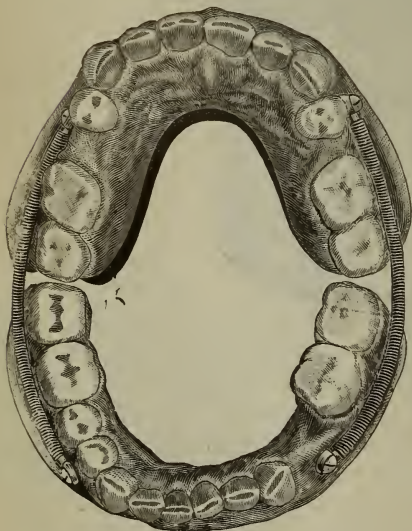
FIG. 21.



cal prominences were meant to slightly fill out the cheeks, and to protect the soft parts from the springs.

Fig. 21 presents us with a three-quarter-view of the same case, showing the articulation to be on the cutting-edges of the incisors, in imitation of the natural teeth. To give a more natural appearance, we left out the second superior bicuspid, indicating a lapse of time since its loss by representing the space as partially closed up by the molars having moved forward. In the lower jaw both bicuspids are missing on the left side, while the molars have

FIG. 22.



moved forward until stopped by the superior first bicuspids; the lower cuspid was unable to move backward by being locked between the superior cuspid and lateral. This illustration shows another view of the "plumpers" and springs.

Fig. 22 shows partly the reason for the use of springs: the mouth being very flat (see Fig. 19), hard, and dry, afforded little opportunity for a plate to be held by atmospheric pressure. The patient was nauseated by the slightest touch upon the posterior portion of the hard palate, and too irritable to allow any efforts to overcome its sus-

ceptibility. Being an epicurean, and thoroughly convinced in his own mind that with an ordinary plate he could not taste his food,



some other method had to be resorted to. We therefore adopted the old European manner of attaching ivory blocks to the jaws—happily a lucky expedient in this case. The engravings show the manner of applying the springs and the shields for protecting the soft parts from being irritated by them. In Fig. 22 we see the abraded cutting-edges stained, the irregularities, the spaces left by the lost teeth, the relation of the teeth to each other, and the shape of the plates. The lower molars are leaning towards each other across the tongue, the incisors inclined forward, etc., all tending to make the case as natural and comfortable in the mouth as possible.

(To be continued.)

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## PROCEEDINGS OF DENTAL SOCIETIES.

### AMERICAN DENTAL ASSOCIATION—TWENTIETH ANNUAL SESSION.

#### FOURTH DAY.—*Morning Session.*

THE association met at 9 o'clock, President Shepard in the chair.

Section Second, Dental Education, was called and the report was read by Dr. J. N. Crouse, Chairman.

The report alluded to the necessity of continuing to call attention to reforms recommended in former years as the only means of securing their adoption. Nearly all who have taken part in the work of the Section have emphasized the need of insisting on a better preliminary education on the part of the intending student of dentistry. The Section urged the association to fix a standard of such preliminary education, and to insist that, in addition to the knowledge and mental discipline acquired by such a course of study as is usually embraced in the curricula of the best academies, the student should have some office-training and a preparatory course previous to attending lectures. The colleges should insist upon a more rigid preliminary examination of matriculates, and should exercise greater care in the examination and graduation of students, which would be secured by placing the examination of students in the hands of a board of regents selected from the best men in the profession, thus giving the profession a direct oversight and interest in their work. The Section were of the unanimous opinion that a higher standard of education would be attained if all the schools should require attendance upon two full courses of lectures before allowing the student to come forward for graduation. They therefore recommend the adoption of the following resolution:

*Resolved*, That in order to secure representation in this association, dental colleges must, subsequent to October 1, 1881, require all students entering therein



to take two full courses of lectures previous to coming forward for graduation, and shall so state in their next annual announcement.

So far the schools which have made their requirements to correspond with the resolutions adopted last year, are the Dental Department of the University of Pennsylvania, the Dental Department of Vanderbilt University, Boston Dental College, and the Western College of Dental Surgeons. The Dental School of Harvard University and the Dental Department of the University of Michigan were previously enforcing such requirements. The Section feel sure that the other respectable schools will comply with the requirements of the resolutions.

The Section also reported two papers, by Dr. T. W. Brophy, of Chicago, and Dr. L. C. Ingersoll, of Keokuk, Iowa, the former arguing briefly the affirmative of the question, "Is Dentistry a Specialty of Medicine?" and the latter the negative.

Dr. Brophy read his paper, of which the following is an abstract: ARTICLE III. of the Code of Ethics of this association states:

"Dental surgery is a specialty in medical science. Physicians and dentists should both bear this in mind."

The time has not, nor will it ever come when the medical profession will recognize individuals or a body of men as medical specialists, no matter how eminent and scientific they may be, unless they are graduates in medicine,—in short, medical men. Indeed, it would be as unreasonable for dermatologists, ophthalmologists, gynæcologists, or other recognized medical specialists, to teach their departments, each as an independent profession, and expect to be called medical specialists, as it is to call the dental graduate, much less the man who has not received a dental college education, a specialist in medical science.

There is but one way by which dentists can become medical specialists, and that is by acquiring the broad foundation of a medical education, upon which every medical specialty must be based, the specialty of dental surgery included. Therefore, the members of this association should require their students to attend the prescribed course of lectures in a medical college and graduate as Doctors of Medicine before entering upon the specialty of dental surgery.

Unless this association adopts this report, or such portion as requires all members to demand that their students graduate in medicine, or adopt some measure by which this clause may be carried out, I believe that it will be to our credit as a society to expunge from the Code of Ethics the clause, "Dental surgery is a specialty in medical science."

Dr. Ingersoll's paper was read by Dr. Thomas Fillebrown, of Portland, Me. Following is an abstract:

The growth of the sentiment requiring a higher dental education can be traced to two sources,—one, social science, the other, moral science. Out of social science springs the desire that the profession should stand higher in public estimation when compared with other professions. Out of moral science springs the philanthropic desire that the profession should be able to do better service for mankind in the prevention and relief of suffering, and in promoting health and long life.

In spite of all doctrines of equality, *higher* and *lower* are meaning terms, and indicate different degrees in the social rank. Equality of the human race is only known in embryonic and infantile life. The born king and the born serf are on an equality at the mother's breast, except for their clothes. The wise man and the fool sat on their mother's knee equals, so far as sense or science knew. Development makes them to differ; and development is education. *E. duco*, a primitive form of words from which our word *education* is derived, signifies a leading-forth of the attributes, formations, and powers of man's entire being, and begins, in its most important sense, at birth. Whenever, then, we talk of education, let us keep in mind this primary idea of development, of leading-forth powers and functions to an objective activity. It means advancing from less to greater power. It means increase of mind-resources.

Compare now this definition of education with the popular notion that education consists chiefly in storing the memory with long lines of facts, just as you force into the mind of a child that long line of unrelated letters we call the alphabet. To memorize facts and propositions is a very important part of education. It is gathering together the material. It is the first step in advanced culture, just as memorizing the alphabet is the first step in primary culture. But the alphabet, however thoroughly memorized, contains not a single idea. *Letters* must be put into relationship with each other before they can become meaning symbols of ideas. So, memorized facts and principles must be put in relationship to each other before they can have in them the educating element in the better sense.

The mind as a receptacle of such material as we call knowledge, and the mind as a power capable of working-up this material for practical use, are two different conceptions.

Every enlightened educator conceives it his business to train the mind to an active exercise of its faculties. Every mental endowment is put under discipline. Each faculty in its turn,—observation, memory, reflection, reason, judgment,—all come under the master's hand for training.

A man thus educated cannot handle anything without observing its nature; cannot see anything without reflecting on its uses; cannot listen to the enunciation of a principle without applying it; cannot hear a proposition without penetrating its meaning; cannot enter the field of argument and stop short of logical conclusions. This habit of mind is the key to knowledge—theoretical, practical, and scientific. Lead forth a mind thus trained into any of the practical ways of life,—into politics, religion, philosophy, science, commerce, trade, or mechanics,—and the conquest is easy and certain.

I have written thus much about education in a general sense—education as a primal idea—so as to be able to say with some clearness and force that a little specialized knowledge is *not education*.

To begin education in the dental college and end education in the dental office can never raise dentistry to the rank of the learned professions; general education will, special education will not. When we look forward to and hope for the elevation of the dental profession, we must seek recruits among the better-educated class.

It is the mind and not the fingers that make the man. It is the full, rounded mental development and not mere manual dexterity that creates the superiority of man among his fellows.

We are now prepared to consider the question, What is special education, or education professionally considered?

First, it means *education*. It implies the possession of mind with mind-capital,—mind-forces developed and active. The gaining of a special education means the application of one's native and acquired mental powers to some profitable use,—to some special work demanded by civilized society,—in conducting which, thought and learning constitute the chief capital. Success, then, depends upon having such capital to put into it.

As regards the science of dentistry, its basal principles are as intricate as the nature of man, and as hidden as the forces of nature. They cannot be well understood and successfully applied without learning. Facts and principles are confusing to an untrained mind. It knows not how to arrange them or how to use them. The untrained mind studies *much* to no profit, comprehends little, and acquires less; for each little is but a part of an unknown whole.

If, then, we would raise the dental profession in social rank and secure best its philanthropic aims, it can only be done by a deep and broad culture, such as educated men, who have already acquired rank and position, will recognize and respect. A skillful hand, without the cultured brain, can never make dentistry what it deserves to be. The habit of thought and investigation is far more important to the student of dentistry than any acquired skill of hand.



In this view of the subject the elevation of the rank of the dental profession depends far less upon the curriculum of study in a dental college than upon the curriculum of study before entering the dental college.

It is conceived by some, perhaps by very many, that the preliminary course of study as a qualification for the study of dentistry should be a full medical course. However great a store-house of scientific facts the medical school may be, the amount of scientific knowledge the medical student brings away, as a foundation on which to build the systematic structure of practical dental science, depends upon his mental qualifications. If he goes into the medical school an ignorant, untrained boy, he comes out such. If he has never had reason and judgment cultivated, and has not acquired a quick apprehension of principles and a discernment of related facts, I would much rather the student should spend two years in a well-equipped academy than two years in a medical school, as preparatory to entering upon the study of dentistry.

*Is dentistry a specialty of medicine?*

I answer yes, and I answer no; for the question will admit of both an affirmative and a negative answer.

When the science of medicine is spoken of in its fullest and most expanded sense, it may be made to include dentistry and all other specialties that make any part of the physical man a subject for scientific research.

But there is no such use of the word in common parlance. The term medicine, as applied to a department of science, unless otherwise specifically defined, must be understood in its popular sense, and *is* generally so understood. In this sense the term medicine means the teachings of the medical schools, medical text-books, and medical literature,—that science which is taught as a basis of the medical practice, and which is represented by the medical faculty and by the recognized medical profession of this country. Medicine in the broad sense is *anthropology*,—the science of man. Of this science, medicine, as properly understood, is itself a *specialty* in the same sense that dentistry is a specialty. Both draw their facts from the same broad field,—man's physical nature.

The phrase *specialty of*, means *part of*, or a *department of*. Who can pretend that it has ever been even the *smallest part* of medical teaching in the schools of medicine to qualify the student for the practice of dentistry?

Who can pretend that there is to be found anywhere in medical text-books or in general medical literature any basis on which to build a dental practice? Who can pretend that there is anywhere in this country a medical faculty who, by their college lec-



tures, supplemented by the private teaching of the best strictly medical preceptor, could ever qualify a student for the practice of dentistry? By what authority, then, is dentistry to be declared a *part of medicine*, a *department of medicine*, or a *specialty of medicine*? If dentistry has been forever ignored by the schools of medicine; if its paternity cannot be traced to college faculties and the medical profession; if dentistry has become an established science from sources outside the medical faculty and medical schools; if, after centuries of medical teaching in well-endowed medical schools, dentistry has been compelled in the nineteenth century to establish its own schools and open new fountains of knowledge; if it has established a profession based on scientific facts never known to the medical profession, and has correlated these facts into a science, and proved it by a systematic practice, demonstrated not on the cadaver, but on the living subject, we should be ashamed to seek its paternity where it is not to be found, merely for the sake of honorable mention. It is a sign of feebleness and weakness to ask for the mantle of a time-honored ancestry to cover us. Much better for the dental profession to claim that we came forth, Adam-like, out of virgin soil.

If in neither ancient nor modern times medicine and dentistry have stood in any other relation to each other than that of independent brotherhood, it is a confessed weakness in the day of our strength and honorable standing to ask that medicine shall belie herself and all her past history even to own a worthy progeny.

The resolution proposed in the report of the Section was adopted, on motion of Dr. Essig, Dr. Crouse explaining that it was intended to take the place of the second resolution on the same subject adopted last year.

Dr. Allport. Some are inclined to criticise our colleges for the lax way in which they give instruction, and their low standard for graduation. It is easier to criticise than to make out a system that shall be an improvement on that now in vogue. While it is clear that the time has come for a changed mode of instruction and improved qualification, too great thanks cannot be given to the colleges for what they have done. There should be a division of the two branches of the profession. Those who intend to follow the mechanical branch should be exclusively educated for it, and those who elect to become dental or oral surgeons should be educated in medicine, supplementing this by special instruction in dental surgery. The objections urged against this plan are, that on account of the greater time required, it will be difficult to get young men to adopt it; and that the community expect the dentist to do all that

is required, whether it be dental surgery or artificial dentistry; that people will not go to one practitioner for services in the former department, and to another for the latter.

The first objection will continue to hold good so long as both branches of the profession are included in the same course of instruction, and students are required to qualify themselves in both before graduating in either. If the time now devoted to mechanical dentistry were employed in acquiring a thorough medical education, supplemented by special instruction in oral and dental surgery, but little more time would be needed to thoroughly qualify students to practice dental surgery as a medical specialty than is now taken to partially qualify them to practice in both departments. If dental surgery is a specialty in medicine, surely the foundation for its practice should be laid in the broad and comprehensive teachings of that science—best secured from standard medical text-books, and in regularly-organized and fully-equipped medical colleges. A knowledge of the general principles of law is essential to the intelligent practice of criminal, admiralty, or any other special branch of law. No one would be allowed to practice in any of these departments without first passing an examination in the fundamental principles of that science. Nor should any one be regarded as a special practitioner in any department of medicine without careful and thorough teaching in the basic principles of that science.

To follow the calling of a mechanical or artificial dentist properly, the practitioner should have a reasonable knowledge of the anatomy of the parts about which he works, as well as of chemistry, including metallurgy and the laws that govern mechanics; and he should be specially instructed in applying these principles in his calling,—one of the most difficult branches of mechanics. A good mechanical dentist must know how to put up teeth on rubber, celluloid, gold, the various cast metals, and the finest of all artificial dentistry,—porcelain continuous-gum work on platinum; and he should be able to so adapt these various kinds of work to meet the exigencies of cases presented that, in a mechanical sense, the greatest benefit possible may be derived in masticating. It will not be maintained by teachers in our dental colleges that the instruction given is sufficient to thoroughly qualify graduates to so put up work by these various methods as to give their patients the greatest benefits attainable. But little attention is paid to any kind of work except rubber and celluloid,—the cheapest and lowest grade of dental plates known. Few, indeed, of these graduates can do acceptable work on gold, much less platinum. Too many of our teachers are as poorly qualified to put up these higher grades of work as are the graduates they send forth. The result of this

inferior instruction is a very low grade of mechanical dentistry; and it will exist just as long as the present mode of teaching and mixed practice prevail. Regarding this branch of our practice simply as a mechanical calling, the man does not live who can thoroughly qualify himself to render to his patients the service they are entitled to with anything less than two years of the most careful practical instruction. But a set of artificial teeth should not be regarded simply as a mechanical fixture. Their proper construction requires the application of some of the higher principles in art. Artistically considered, a set of artificial teeth should be so adapted in color to the age and complexion of the wearer, in size and contour to the shape and expression of the face, as to attract no more attention than does the nose, the eye, or the hair. The fact that they are artificial should be concealed, and this can be done by no one without a knowledge of contour and the proper blending and harmony of colors, acquired only by a careful study of the principles involved in art. But, however closely the manufacturer of artificial teeth may copy nature in those thrown upon the market, the great lack of artistic knowledge among a large majority of dentists renders most sets of artificial teeth in the mouth conspicuous advertisements of the fact that the dentist who put them in was as ignorant of art as he was of the contents of the moon. If students in mechanical dentistry would devote to art-study the time now spent in procuring a partial medical education in our dental colleges, that calling would soon assume its proper place among the higher branches of professional art.

The other objection to this division of practice is equally untenable.

If this question could be properly discussed by the great educator of the people,—the newspaper press of the country,—the public would soon become so educated upon the subject that they would as much think of going to the general surgeon for artificial limbs as to the dental surgeon for artificial teeth; and certainly no one would think of going to the maker of artificial limbs for surgery. The greatest excellence is always gained by subdivision of labor, and in no field could we look with greater hope for development and skill, by division, than in the study and practice of the two departments of dentistry.

Dr. Morgan. Perhaps ten or fifteen years ago, when this matter was first mooted, after some immature thought upon the subject, I went upon the record as in favor of the divorcement of the two branches. I have since then had cause to change my opinion, and the more I think of it the more impossible it seems to be to accomplish the object. There is such an interlacing of the two that it seems to me impracticable for it ever to be brought about. The



mechanical branch of dentistry so interlocks with operative dentistry, or oral surgery, in the correction of irregularities of teeth, for instance, that it seems to me an impossibility to separate them. The dental surgeon who undertakes to correct a set of irregular teeth should not only be able to devise in his own mind the means by which he purposes to accomplish it, but he should be able to construct his fixtures for that purpose. I take it that the man who desires the accomplishment of a certain end, and understands the means by which it can be done, can, if he has good mechanical skill, produce the apparatus needed in greater perfection and with better adaptation than can the outside mechanic who does not understand the principles upon which it is to be applied; in other words, that the dentist who understands the construction of appliances can make a better one for the correction of irregularities than it is possible for any mere mechanic to produce.

Again, you can no more separate artificial dentistry from dental surgery generally than you can separate medicine from the practice of dentistry. None of us claim to practice medicine, and yet constantly cases come into our hands which require us to turn to the medical art and apply its principles in our practice. For instance, a patient comes into your office in trouble with, perhaps, an incipient abscess. You look at the case, examine your patient, and find his general condition to evince a tendency to inflammation. You do not think in such a case as that of calling in a regular physician to give him general treatment, but, with some mild treatment, you send him away with the expectation of seeing him come the next day in better condition. All of us are compelled, from time to time, to administer medicine addressed to the general system. It is so inconvenient, and sometimes so impossible, to make medical men understand the condition of the patient, that you are necessarily compelled to administer medicine yourself. In the same way, it seems to me, these two branches of dentistry are so interlocked with each other that it is impossible to separate them. Besides, sometimes artificial substitutes have to be applied in mouths that are in a pathological condition. What are you going to do in such cases? Are you going to turn your patient over to an ordinary mechanic who knows nothing of the condition the mouth is in, who understands nothing of pathology?

That is not the way an intelligent mechanical dentist performs his duties. It seems to me that the two branches necessarily interlace, and that dental education should be based upon medical science, and then the principles of mechanics, as far as they apply, should be studied in the two blended together for the accomplishment of the highest results.

Dr. Buckingham. I take the ground exactly that Dr. Morgan has just taken,—that the two branches are so interlocked with each other that it is impossible to separate one from the other. It is very evident from what Dr. Allport has said that he has not considered what is and what should be taught the mechanical dentist. It is not merely the manipulative part of making a set of teeth,—the mere mechanical operation of putting them together; there are other things that should be taught him. In that branch the principles of mechanics are taught; and not only those principles, but the expressions of the face are taught. We had quite a number of lectures in our college upon the anatomy of expression,—the different muscles that are brought into play. We have also lectures upon the anatomy and structure of the voice. These all come in as well as the expressions of the face. There is no place that this can be taught more appropriately than in some public institution. If you choose to separate the profession and make a mechanical branch and an operative branch, it would be very well, but they are not so extended but that they can be studied together, and, as Dr. Morgan said, they must necessarily interlock and go together in practice.

We do not profess to be able to make a man thoroughly perfect in the operative branch, and turn him out in the condition of a man who has been in practice thirty years. We want to teach him the principles,—teach him why he saves teeth and how it is to be done,—and when he has learned that he goes into practice.

We talked yesterday morning about packing gold and putting it in, one piece after another. There was no principle involved in it; there was no reason why one saved the teeth better than the other, except that one might be more perfectly put in than the other. It was a mere mechanical discussion throughout the whole. What we want to teach students are the principles, as well as the practice, as far as we can, because you cannot make any man perfect in a very short time. The schools are but the nurseries, and I will put it to any reasonable man, if any school is not better than most private offices we have to-day. We know it is the case that the very best dentists we have do not have students, and where are the students to go? Dentistry is growing gradually. Men who are around me now, who saw dental colleges twenty or thirty years ago and compare them with what they are at the present time, will be surprised at their progress. They are now advancing dentistry as fast as any other of the branches of science. The system is not perfect, and will not be perfect in our generation, but we are possibly growing faster than any other profession that is now in existence.

I am opposed to this process of separating, and I am opposed to

another matter. There was a little article I saw at the head of a paper the other day that struck me very forcibly: "If you want any information about any kind of business, go to somebody that never was in it."

The field of dental education is open wide. We are doing all we can, and we want the sympathy of the profession. We have got nothing but discouragement from these conventions all around. They have found fault with us. Every little flaw is picked out—many things from reports outside that were not true. They never come to us with one word of encouragement; they never come to see us; they never give us one dollar of assistance, and yet they come here and complain about us for doing bad work. It is not fair. Some of us have devoted the greater portion of our lives,—twenty-eight years have I attempted to teach dentistry, and to do the best I could by it,—and this is all the satisfaction we get. It is not money; everybody knows we do not expect to get money. If we do wrong, come to us kindly, as you would to a brother, according to the scriptural rule, and show us wherein we are doing wrong, and then advise with us and we will do very much better; but if you scold, we get crooked and don't do any better than we did before.

If we were to build up a model student, and had the privilege of educating him before he came to the college, we should probably give him a very much better dental education than we do. We must take the material that we can get. They accuse us of turning out material that is not good. We have many men who prove to be humbugs after they get out. Does not every institution in the country—medical, theological, and everything else—contain men who are naturally born quacks, and who will be quacks all through? Some of the greatest quacks are those that are well posted. We cannot control a man after he leaves college. Give us encouragement, and let us work and do the best we can.

Dr. Stockton. I do not think it is quite true that we come here to find fault with dental colleges. It has been said that our profession owes more to-day to dental colleges than to anything else. I think that is true. There is one thing where I think there is a wrong. Dental colleges are not responsible for it, but I think we as dentists are. There is a law in nearly all our States regulating the practice of dentistry, and there are more men coming into the profession through the State examining boards, I think, than almost any other way. The general education of the young men coming before examining boards is not such, in a large majority of the cases, as to qualify them for dentists; and, too, the examiners in many cases have not that practical experience in making examinations that will enable them to ascertain whether these young men are



qualified or not. Some of the examining boards do not require any really practical examination. I think the wisest thing that can be done is for us to put our discouragement on those examining boards. I know of young men who have passed the examining boards who cannot write a sentence correctly, and yet they are recognized as dentists by the law of the land. Our dental colleges should be sustained, in order to bring our professional standard yet higher. I am glad this preliminary education has been talked of. The higher the education of the man when he enters dentistry the better dentist he will make, and the more useful citizen, too, will he make in the community.

Dr. T. T. Moore. The principal reason why colleges turn out bad or indifferent men as practitioners arises from the fact that they have bad or indifferent material out of which to work. Since a majority of the best men in the profession refuse to take students, it stands to reason that, as a general rule, they (the students) come to the colleges through a lower grade of operators, and in many instances are devoid of a proper education. So let us not pull down these institutions of learning that have done so much good, but rather foster their interests and encourage them to higher attainments, by sending to them only *well-educated, competent, and refined* students.

As Dr. Stockton has remarked, a great many States have examining boards. Now, in our State (South Carolina) we have a law regulating the practice of dentistry, and a board of dental examiners, of which I have been a member for the past five years, during which time we have not granted a permanent certificate to any one. We have pursued the plan of granting a temporary license to practice until the opening of the colleges, and we advise the licensees to attend lectures and perfect themselves. I believe if this course were adopted by all other State boards of dental examiners it would be found the wisest, because no man who has not availed himself of every opportunity of acquiring all the knowledge that is attainable of the profession which he intends to practice has a right to a license to practice that profession, be it dentistry, medicine, or anything else.

Dr. J. G. Templeton, Pittsburgh, Pa. I have heard nothing practical suggested to remedy the state of things in the dental profession at the present time. I think Dr. Buckingham spoke the truth when he said the colleges have to take such material as is sent to them. What is the reason that such material is sent? All over this country dentists are taking into their offices boys to attend to the drudgery and act as assistants. Finally, these boys take a notion that they would like to become dentists, and off they go to dental

colleges; having been taken into the office without any qualification or preliminary education, they will be graduated without having had the proper foundation laid.

How are you going to remedy this? How many local organizations have any rules or regulations restricting their members?

I would ask, can a young man enter the office of any attorney in the city of Boston without passing an examination as to his qualifications—whether he will be accepted as a student? I think not. I know it is so in our city, and it is also true in the medical profession in all the cities. A young man cannot become a student in the office of any physician without passing an examination in regard to his literary qualifications.

For three years I have advocated this idea in our own local society, and a little over a year ago I succeeded in having a committee appointed to draft resolutions, which were adopted, which provide for an examination of students in certain branches before their admission as students.

I have had several applications from young men to become students, and in the last two or three years I have rejected five or six, because I thought their educational qualifications were not sufficient.

[Dr. Templeton related the history of two applicants whom he advised to attend school for two or three years before entering upon the study of dentistry, one of whom, disregarding his advice, entered a dental college, attended two courses of lectures, and failed to graduate. The other came home sixteen months afterwards with a diploma, and is now practicing.]

The following are the resolutions referred to:

WHEREAS, The profession of dentistry now suffers and has suffered in the past from the empiricism of many of its practitioners, and

WHEREAS, The dentist occupies the position of a public teacher, and his education should be such as to enable him to give a satisfactory and scientific reason for what he does or proposes to do; therefore,

*Resolved*, First, that an applicant for the position of student in the office of any member of this association shall not be less than eighteen years of age, be of good moral character, and shall furnish satisfactory testimonials of the same.

Second, a diploma from any chartered literary institution shall be deemed sufficient evidence of an applicant's preliminary educational qualifications.

Third, the minimum preliminary educational qualifications shall be a thorough knowledge of orthography, reading, writing, arithmetic, grammar, and geography, together with a knowledge of the Latin grammar, and ability to read and translate a selection from any of the first five books of "Caesar's Commentaries."

Fourth, that an examining board, composed of three active members of this association, be elected at each annual meeting. The duty of said board shall be to examine all applicants for admission as students to members of this association. After examination of an applicant, each member of this board will be entitled to ten votes, the applicant to receive twenty votes to entitle him to become a student.

Dr. W. C. Barrett, Buffalo. I desire to say a few words concerning the connection between medicine and dentistry. It is useless for us to attempt to strut about in borrowed plumes. We can deceive nobody. Let us be honest and look the matter squarely in the face. Because the teeth are a part of the human anatomy, and a certain class of persons perform certain operations upon them, or make appliances for their cure or comfort, shall they therefore be classed as medical men? Do they thereby become members of an old and venerated profession? If so, then may shoemakers on the same grounds claim admission to the profession. If so, there is no medical profession, for old-established landmarks are at this one fell swoop broken down. It would be pleasing to us and flattering to our vanity could we thus cheaply earn so valued a privilege and thus quickly secure a professional standing which physicians have spent years in gaining. Every cross-roads peripatetic tooth-tinker a member of the medical profession! Why, of what are we thinking? Are doctors thus easily made? I tell you there is but one door of admission into medicine, and that is the front door of a reputable medical college; medicine acknowledges but one form of credentials, and that is an honestly-earned medical diploma. Any affiliation which we may gain, notwithstanding a similarity in practice, must be by first becoming medical men ourselves. We cannot practice a specialty *in medicine* except we first qualify for the practice of the general science in which we desire to become specialists. Will an ophthalmologist, a gynæcologist, a surgeon be acknowledged by medical men if he attempts the practice of this specialty before he has qualified in general medicine? And should we as dentists claim what is accorded to no other class of men, even though they practice a specialty much more nearly related than is ours? We must take higher ground. We should scorn to attempt this sneaking burglary into an honorable profession. If we are to be medical men, let us each and every one secure the proper credentials, then there will be no caviling at our claims to recognition. When we have passed the full curriculum of medical schools and secured an honorable place in medicine, we may *then* go out in any specialty we may choose, and retain our standing. We may then claim to be specialists *in medicine*; but nothing short of this can make us such.

Our dental colleges have done a wonderful work. I yield to no man precedence in giving honor to our schools, but they are not what they might,—what they ought to be. Nor are our literary or our medical colleges yet perfect. It is sufficient encouragement, however, to know that they are improving every day, and the fact that the condition of our dental schools is a matter of much anxiety to the thinking part of the profession, that one section of our most



important dental society is given up to the consideration of the state of education, is ample proof that the profession is not satisfied, but desires to make yet further advancement. We are rising, step by step, and can see the men who, on the mountain-tops of progress, are illuminated by the dawn of the coming day. In my humble opinion the future of dental education lies in the direction of the university. The time must come when the segregated schools must be abandoned or linked with medical schools or universities, because in those institutions may be found the greatest facilities for study. Great universities possess laboratories and museums and apparatus which smaller institutions cannot afford. Segregated dental schools, for instance, cannot teach anatomy or physiology or chemistry as thoroughly as can schools more entirely devoted to such studies, and therefore, to my apprehension, does the future of dental teaching lie in a union with them, that the same professor who has devoted his life to that department may teach the student in medicine and art and dentistry the same thorough anatomy or chemistry, leaving to special professors the teaching and properly equipping of the ophthalmologist or dermatologist or dentist in his special study. The only possible source of regret may be that in the accomplishment of this tendency the old teachers in dentistry who have grown gray in gaining experience do not cast in their lot with the universities and continue what they have always been, the leaders and directors in the cause of professional education.

In saying these things I do no injustice to our excellent dental schools. It is to them that we owe the very fact that we are a profession to-day. That American dentistry occupies its present high position we owe to the old dental colleges and to the self-sacrificing men who have labored in and with them. But the time is coming, and even now is, when something more is demanded; when that which has sufficed for the past, that which was even far in advance of the demands of its day, is insufficient for the wants of the advanced profession. Those men who founded the dental colleges builded far better than they knew. They laid foundations so broad and so deep that the superstructure which they reared does not cover them. A few years since dentistry did not demand educated men. The dentist was considered simply an artisan, and it was as absurd to demand a preliminary education in him as of a shoemaker; but to-day far weightier responsibilities rest upon him. To him are intrusted interests and operations unheard of a generation since. He is supposed to be a gentleman and to be the companion of gentlemen. He must be versed in matters which imperatively demand a trained mind and educated brain to comprehend, and therefore, the great prerequisite to the becoming of a competent dentist is a good,

liberal education; a *preliminary examination* before entering upon dental practice. This fact is fully recognized by our English brethren, and to-day they acknowledge no institution that does not require such preparation.

It is a long step in advance when dentistry is acknowledged by the universities and is given a place by the side of medicine, law, and theology. It is a recognition of its importance, and of the fact that the world makes the same demands upon its practitioners for intelligence and familiarity with the broad field of general science that it does upon lawyers and preachers. We who are of such recent origin are put in familiar companionship and on terms of perfect equality with those great professions which have existed since men were subjected to illness of body, oppression by the stronger, and a haunting dread of some possible hereafter. Law, medicine, and theology have carefully kept their doors guarded, and jealously resisted encroachments by other guilds from the earliest ages to the present time, scarce admitting art to a fellowship; and now, wonderful to relate, they meet us on equal grounds. Can any one say this is no advance? It only remains for us to rise to the exigencies of the occasion, and prove by our acts that we are worthy a place among the learned professions. To do this we must demand of dental students yet higher attainments. We must furnish to them opportunities for full scholastic training. They must enter the lower doors of a universal institution that shall have the facilities for advancing them through all the several grades, until it finally graduates them educated men and competent, thoroughly-equipped dentists.

Dr. I. J. Wetherbee, Boston. All the remarks that have been made to-day ignore entirely the very thorough teachings in dental colleges of anatomy and physiology, of the principles and practice of surgery, and of therapeutics and pathology. It appears to me that these medical branches can be as thoroughly and efficiently taught in a dental college as in any medical college.

If therapeutics receives proper attention, does it not cover sufficient of medicine to prescribe for certain conditions of the system which are made known to us by certain indications? I wish to claim this fact, that every intelligent medical man throughout the length and breadth of the country will acknowledge, that the practice of medicine is empirical. And now there is a claim made that we must come up and adopt this empirical child.

Do not understand that I am for a moment contending or pleading for a partial education. My sentiments are too well known by this association for you to accept for a moment that belief; but we have evils to contend with. Massachusetts, a few years ago, in her

society, established the rule that no man could become a member unless he had a degree; but they abandoned that position and let in everybody that wished to come in. By this retrograde action we struck a blow against the progress of dentistry; and, until dentists shall come up as a general thing and put their foot upon this reception of students in private practice, societies, and colleges, unless they have a good preliminary education, we shall be hindered in our work.

But give the dental colleges credit for what they have done. The Boston College, which I represent, no longer receives students except for two years, and they must pass an examination, before they can matriculate, requisite to admission to the best high schools. We intend to follow this rule of action, and shall maintain it. We have placed ourselves in the line of progress for the purpose of making better men and better dentists.

Section Second was passed.

(To be continued.)

### BRITISH DENTAL ASSOCIATION.

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*Vice-President.*—Thomas Underwood, L.D.S., R.C.S.

*Treasurer.*—James Parkinson, L.D.S., R.C.S.

*Hon. Secretary.*—J. S. Turner, M.R.C.S., L.D.S.

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J.T. Browne-Mason, L.D.S., R.C.S., <i>Exeter.</i>	R. White, M.R.C.S., L.D.S., <i>Norwich.</i>

## EXTRACT FROM BY-LAWS.

"A person who is registered in the Dentists' Register shall be eligible for election as a member of the association, provided that he be of good character; that he does not conduct his practice by means of the exhibition of dental specimens, appliances, or apparatus in an open shop, or in a window, or in a show-case exposed to public inspection; or by means of public advertisements, or circulars, describing modes of practice, or patented or secret processes; or by the publication of his scale of professional charges.

"Any registered dental practitioner who can subscribe to a declaration (provided by the association) embodying the preceding by-law, and who shall be recommended as eligible by any three members of the association, may be elected a member by the Representative Board, or by a committee appointed for that purpose by that board."

All communications should be addressed to the Hon. Secretary, 40 Leicester Square, London.

At the first general meeting of this association, held July 26, the secretary stated that since the institution of the association, sixteen months ago, they had enrolled 383 members. Of these, 330 were resident in England, 33 in Scotland, and 4 in Ireland. Of the English members, there were 112 resident in London, and 3 in the Channel Islands. The members resident abroad were, in New Zealand, 3; Australia, 2; West Indies, 2; Montevideo, 1; and in India, 1.

## EDITORIAL.

## OUR NEW DRESS.

WISHING our subscribers, one and all, a Happy New-Year, we have the pleasure of presenting the DENTAL COSMOS in a complete new outfit. We congratulate ourselves and our readers on its appearance not less than on the excellence of its contents, and take this occasion to suggest to some of our old friends from whom we have not heard recently, and to others who have never favored us with contributions, that our new, clear-faced, and neat type affords them an exceptionally good opportunity to present their best thoughts. We feel assured that no one need wait for a better medium of communication with the profession, nor for better company in which to appear; that none will bring to its pages matter for the best presentation of which we are not fully prepared.

## ANXIOUS INQUIRERS.

THERE must come a time, sooner or later, when we may reasonably expect, without liability to give offense, to decline the insertion of oft-repeated questions, so purely elementary that no one thinks of replying to them. It is even now about time that a practicing dentist who wishes to know in a general way how to treat alveolar abscess, refer either to his text-books or to back numbers of the DENTAL COSMOS for the information. We are always ready to help novitiates, but we cannot help wishing frequently that inquirers would look over the current volume, at least, to see if the question propounded had not been already asked and answered. It would pay any young practitioner to read and study carefully the answers to queries which have appeared in the DENTAL COSMOS within the last few volumes.

## REPORTS OF SOCIETIES.

"THE secretary was directed to send a report of the proceedings to the DENTAL COSMOS for publication." We received the report in the shape of a printed newspaper notice of the proceedings, hastily and imperfectly prepared, in which the place, the day, and the hour of meeting, the dollars and cents in the treasury, the subjects of discussion, and the titles of essays are given at full length, but no line of professional interest or practical value. We could not, of course, burden our pages with such a report. The members wondered that it did not appear, questioned the secretary if it had been sent, and receiving assurance that it had, concluded that the DENTAL COSMOS

deliberately intended to ignore the society, and that there must be some special reason for the evident slight. We insert this explanation, that the society may understand the reason for the non-appearance of the report.

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### SIC SEMPER FRAUDIBUS.

IN view of the wide-spread mischief which "Professor" John Buchanan seemed determined to inflict upon the community by the fraudulent sale of diplomas, bringing disgrace upon the city and a general distrust of reputable institutions, to say nothing of the licensing of unqualified persons to practice medicine, he must be considered as an enemy of society. We are glad, therefore, to announce that Judge Butler has sentenced him to pay a fine of five hundred dollars and the costs of prosecution, and to undergo an imprisonment of ten months in the Eastern Penitentiary. This on the proof of attempt to defraud the United States of his bail-bond, by a conspiracy to delude the court into the belief of his death. He has yet to answer in the State courts for the fraudulent diploma traffic.

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### COMPLIMENTARY.

MESSRS. WARD & LOCK, publishers, of London, England, announced recently a series of small volumes on medical and hygienic science, "written and edited by distinguished members of the medical profession;" intended for popular instruction and entitled Ward & Lock's "Long Life Series."

Six of these volumes have appeared, bearing titles made familiar on this side of the water by the series known as "American Health Primers," published by Lindsay & Blakiston, Philadelphia.

Comparing "The Mouth and the Teeth" of the "Long Life Series" with the volume bearing the same title of the "American Health Primers," we find that the body of the book is, with one single exception, an exact reproduction of our own contribution to the latter series. For obvious reasons the sentence alluded to, which reads thus, "It is estimated that twenty millions of teeth are annually sacrificed in the United States," is omitted, and substituted by the words, "Tooth-drawing is the ready refuge of those whose teeth prove in any way troublesome." As this is the only sentence in the book which would betray its American origin, the change justifies the claim of the publishers that it was "carefully edited."

On turning to the title-page we find the names of author, editor, and original-publishers conspicuous by their absence.

Other volumes of the series which we have seen show a like care



to mislead the reader into the idea that they are of European authorship and original publications.

We are glad that "The Mouth and the Teeth" was adjudged worthy of English reprint; but the value of the compliment is lessened by a consideration of its source. In other words, the value of the literary discernment which prompted the appropriation is counterbalanced by the manifestly dishonorable omissions alluded to.

We hope the enterprising publishers may profit by the transaction just as much as they deserve to—and no more.

### SUPREME COURT DECISION ON CELLULOID.

WE publish below the decision of Justice Strong, of the Supreme Court of the United States, in the suit of the Goodyear Dental Vulcanite Company *vs.* Charles G. Davis, appealed from the Circuit Court of the United States for the District of Massachusetts.

It will be seen that the decision squarely affirms that celluloid cannot be held to infringe the Cummings patent. It not only affirms the Davis case, but practically reverses the decision of Judge Wheeler in the *Preterre* case, leaving a clear field for celluloid.

After an admirable summary of the claims of the Goodyear Company, Justice Strong sums up as follows:

"It remains to inquire whether the manufacture, by the defendant, of dental plates out of the material known as celluloid, or solid collodion, is an infringement of the Cummings reissue. We think it is not.

"Celluloid is a substance of a comparatively recent discovery. Whether it was known at the time Cummings made his invention, or even at the time when his original patent was granted, we do not care now to inquire. It is sufficient for this case that we consider what it is. It is a compound of vegetable fiber, cellulose, or gun-cotton. Undoubtedly it can be employed for manufacturing dental plates, and as a base for artificial teeth. Such a plate may have the fineness, lightness, and elasticity of a plate made of hard rubber by the Cummings process, but it is a substance very different from hard rubber, and it is incapable of the same manipulation. It is not vulcanite, and neither it nor its ingredients is capable of being vulcanized. It contains no sulphur or rubber. None of its constituents are vulcanizing agents. Camphor does not perform the function of sulphur. Under the action of heat its tendency is to soften the compounded mass rather than to harden it, as sulphur does rubber. When the ingredients of celluloid are compounded the product is hard, unlike caoutchouc, or gums generally, and heat softens rather

than hardens it. When employed in manufacturing dental plates the process is wholly unlike that employed in making hard rubber or vulcanite plates. It is put into a mold, it is true, such as was known and in use before the Cummings invention, but it is put in in a hard state, in its natural condition, and not soft or plastic, and capable of being pressed around the teeth. The mold cannot be closed until heat is applied. When that is applied the jaws of the mold are gradually screwed together as the celluloid softens, and when the jaws come together the plate is completed. The process requires pressure in addition to heat, in order to reduce the plate to shape and compress it around the teeth. There is no heating for hours, as is necessary in the vulcanizing process. The work is done in a few minutes. When allowed to cool it is the same hard and bony substance it was before its manipulation, and in this respect also it is unlike vulcanite. It is obvious from all this that neither in the nature of the material of which it is made, nor in the process of manufacture, which is an essential part of the Cummings invention, as we have seen, is the celluloid plate substantially the same as one made of hard rubber.

"Nor is celluloid an equivalent for hard rubber, for the reasons already suggested, that it is not capable of vulcanization, and that it cannot be made into a plate by the process prescribed by Cummings. It may be conceded the patentee is protected against equivalents for any part of his invention. He would be, whether he had claimed them or not. But when a product arrived at by certain defined stages or processes is patented, only those things can be considered equivalents for the elements of the manufacture which perform the same function in substantially the same way. The same result may be reached by different processes, each of them patentable, and one process is not infringed by the use of any number of its stages less than all of them.

"In view of these considerations we are constrained to rule that a celluloid dental plate is not an infringement of the Cummings patent. Celluloid is not an equivalent for the material which the patent makes essential to the invention, and in the use of it for a dental plate, the process which is inseparable from the invention, is not and cannot be employed. The decree of the Circuit Court is therefore affirmed."

## BIBLIOGRAPHICAL.

IS CONSUMPTION CONTAGIOUS, AND CAN IT BE TRANSMITTED BY MEANS OF FOOD? By HERBERT C. CLAPP, A.M., M.D., Lecturer on Auscultation and Percussion in the Boston University School of Medicine, etc. Boston: Otis Clapp & Son, 1881.

The question in the title of this volume is one which involves important considerations, because of its practical bearings on so large a proportion of the community. The author believes that, to a certain extent, at least, and under certain conditions, consumption is contagious. He fortifies his conclusions by reports of illustrative cases, and presents the results of experiments on animals, conducted with the express object of solving the problem. He urges that physicians fail properly to instruct families with reference to the danger, and that friends of the sick are needlessly exposed to contagion. The practical lessons which the author seeks to inculcate are—

“(1.) That no person, particularly if young, should be allowed to sleep in the same bed, or even (if it can possibly be prevented) in the same room with a consumptive. (2.) That no person should be allowed to remain for too long a time in too close or too constant attendance on a consumptive. (3.) That ventilation as perfect as possible should be secured. (4.) That the most rigid inspection of all the meat that comes into our markets, particularly at the slaughter-houses, and of all the cows which furnish us milk, by competent government officials beyond the temptation of bribes, should be insisted on for the public safety.”

MEDICAL HERESIES HISTORICALLY CONSIDERED. A Series of Critical Essays on the Origin and Evolution of Sectarian Medicine. Embracing a Special Sketch and Review of Homœopathy, Past and Present. By GONZALVO C. SMYTHE, A.M., M.D., Professor of the Practice of Medicine, Central College of Physicians and Surgeons, Indianapolis, Ind. Philadelphia: Presley Blakiston, 1880.

The object of the book before us is to furnish a condensed history of the rise, progress, and decline of the various medical schools or systems, from the earliest historical period down to the present. More than half of the book is devoted to a presentation of what the author considers much-needed information in regard to homœopathy. The principles of this school he claims to represent fairly, and generally in the exact words of its adherents, announcing, however, his own conclusion that homœopathy will not stand the test of scientific investigation.



In discussing the evolution of medicine the author divides the subject into three periods,—the mythological, extending from the infancy of the human race to about the year 400 B.C.; the dogmatic or empirical, including that portion of time between the period named and the close of the eighteenth century; and the rational age, beginning with the present century.

The condensed information contained in this little book makes it interesting and not unprofitable reading.

TRANSACTIONS OF THE MICHIGAN STATE DENTAL SOCIETY. Twenty-Fifth Annual Session. 1880.

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TRANSACTIONS OF THE ILLINOIS STATE DENTAL SOCIETY. Sixteenth Annual Session. 1880.

We have received copies of the reports of the transactions of the above societies, the first-named containing eighty-four pages and the latter one hundred and thirteen pages. In each there is evidence of a growing tendency and ability to discuss topics outside of so-called operative and mechanical dentistry, indicating a wider range of thought than formerly. Some of the papers will amply repay perusal. A carefully-prepared and valuable paper is that of Dr. G. V. Black, entitled "Some Points in the Natural History of Caries of the Teeth and the Value of Fillings for its Arrest," which appears in the report of the Illinois society.

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## OBITUARY.

### MR. JAMES H. ASHMEAD.

DIED, at Hartford, Conn., December 2, 1880, MR. JAMES H. ASHMEAD, aged seventy years.

MR. ASHMEAD was born in Germantown, Pa., November 17, 1810, and served his apprenticeship in Philadelphia as a gold-beater with Mr. John King. In 1834 he removed to Hartford, Conn., where he remained until the time of his death. In association with Mr. Hurlburt, under the firm-name of Ashmead & Hurlburt, in his own name, subsequently in connection with two sons, and latterly under the firm-name of James H. Ashmead & Son, he was widely known to the dental profession as a manufacturer of gold foil. He was identified with the business interests of Hartford, and had in that city and among professional and business men throughout the country, many warm personal friends. He bore the reputation of an honest and honorable man. He had been in delicate health for more than two years.

## PUBLISHERS' NOTICE.

## THE NEW VOLUME.

THE concentration of thought and effort upon the development of any branch of science results in a knowledge more compact, comprehensive, and exhaustive than could otherwise be hoped for. Indeed, the necessity, the explanation, and the justification of special *practice* is to be found in the fact that the highest results are attainable only in proportion as the sphere of research is thus limited. The uneducated masses even have learned to appreciate the advantages of such practice, and naturally seek advice from those who devote themselves to the study of the particular derangements from which they may be suffering. As the field is explored, the necessity for a special literature arises, and this in turn creates the demand for special journals in every department of scientific investigation.

In view of these facts, it is not strange that a journal devoted to the advancement of dental science should be recognized by intelligent practitioners as indispensable. The wonder is that any man can hope to succeed without availing himself of such a means of culture. No other field of science is being more earnestly cultivated than that of dentistry. Investigation is nowhere else more vigorously prosecuted,—perhaps in no other direction so assisted by appropriate appliances. In no other are the records of observation and experimentation more complete.

Believing that in this march of progress the DENTAL COSMOS has for twenty-two years held a deserved prominence, and that it is today the best journalistic exponent of the science and art of dentistry, we present the initial number of the Twenty-third Volume with the assurance of increasing circulation and influence, earnestly soliciting a continuance of the favors of former patrons, and a trial of it by those who have not heretofore subscribed.

For information as to terms, etc., we ask attention to the colored slip preceding the advertising pages of this number.

TRUSTEES OF SAMUEL S. WHITE.

## PERISCOPE.

**WOMAN AS A SANITARY REFORMER.**— . . . I press this office for the prevention of disease on womenkind, not simply because they can carry it out; not simply because it pertains to what Xenophon describes as their special attributes, their watchfulness, and their love, but because it is an office which men never can carry out; and because the whole work of prevention waits and waits until the woman takes it up and makes it hers. The man is abroad, the disease threatens the home, and the woman is at the threatened spot. Who is to stop it at the door, the man or the woman? The house is her citadel. The majority of women will ask, By what process of training can we help towards a triumph of science so beneficent? I devote myself from this point of my discourse to give some answer to that question. I state at once that the training required is simple—beyond simple; that every woman who wills to go through it may go through it and may become mistress by it of the destinies of the world. Not the Fates themselves were more the mistresses of the destinies of the race than the women of an educated commonwealth who were conversant with the art of the prevention of disease and premature decay. A woman should master physiology so far as to understand the general construction of the human body. She should be rendered fully conversant with the different changes of food that are required for the digestive process in different periods of life; the extent to which the digestive powers should be taxed in infancy, childhood, adolescence, maturity, first and second decline, and old age. She should be made aware what substances, taken as food, are of real, and what of spurious quality. She should be taught the relationship which solid foods hold to liquid foods or drinks. She should be told what drinks are foods, and she should specially understand what are the particular foods required for the young during the periods of active growth. In illustration of the value of this last-named fact, it may be stated that if woman only knew what foods were requisite to feed the skeleton or bony framework of the living body while that skeleton is in the course of growth, and if she would act upon her knowledge, as she almost certainly would if she possessed it, there would hardly be one deformed child left in the land in one or two generations. Rickets, with all its attendant miseries of bowed legs, crooked spines, and humped backs, would pass away as if by the spell of an invisible enchantress. . . .—*Dr. Benjamin Ward Richardson, M.D., F.R.S., in Medical Press and Circular.*

**A METHOD OF FILLING SINGLE-ROOT TEETH.**—In cases of threatened periostitis, after the tooth and root have been properly prepared for filling, take an ordinary pin and press it firmly into the pulp-canal, so that it will remain until the tooth is filled, after which the pin can be easily removed, leaving a round, smooth hole, directly into and the same size as the pulp-canal. Then take a small piece of iron binding-wire of a proper length, and loosely roll cotton-wool round it, dip it into the dressing intended for the root, and pass it up the canal. When it is required to be removed, an ordinary nerve-extractor will easily remove it; the canal can be



at any time permanently filled; and, in troublesome cases, where the patient would have to come a number of times before the tooth could be filled, it often prevents a patient's getting tired of the trouble and giving up having it filled.

This plan of treatment is original, so far as I am concerned, as I have never seen it mentioned in any publication, but probably others have adopted some similar method.

I have practiced it for some time past, but have never found teeth decay afterwards, even in cases where the canal has never been filled except with wool on wire.—*George Beavis, Esq., L.D.S.I., in British Journal of Dental Science.*

**CHLORAL IN SUBSTANCE IN ODONTALGIA.**—Dr. Spörer, in a communication to the *Petersburg. Med. Woch.* (September 1), after describing the great benefit he had derived from chloral, whether administered internally or as an embrocation dissolved in almond oil, for the relief of rheumatic and other pain, states that in toothache and its accompanying facial pain, a most effectual remedy is found in dissolving from a scruple to half a drachm in two drachms of glycerin, and applying a plug of wadding soaked in this to the carious tooth. As, however, this causes, in some cases, considerable irritation of the mucous membrane of the mouth, he has, during the last four years, always applied the chloral in substance. From a half to at most one grain of the granules of chloral are wrapped in a little wool to keep them together, and placed in the cavity of the tooth. When the chloral has dissolved, the accumulated saliva is to be spit out. If the tooth is in the upper jaw the chloral should be kept on by the finger until dissolved. The most violent toothache is in a few minutes relieved. He cites some cases in which most distressing and long-abiding toothache, accompanied by severe prosopalgia, was thus promptly cured.—*Medical News.*

**PAROTITIS SYPHILITICA.**—Bœck reports the case of an old lady, from whose upper maxilla a tumor had been extirpated a year before, with syphilitic mastitis and gummata, both yielding speedily to iodide of potassium. He has seen also two other cases. Where no other symptoms of syphilis are present, the diagnosis may be difficult, the tumor presenting all the characteristics of scirrhus, even to the lancinating pains. Richet gives a case where a tumor like that in the breast was found in one calf of the leg by accident, just as the former was about to be excised, both disappearing simultaneously under treatment by potassic iodide. No other symptom was present. Verneuil has demonstrated pathological preparations from a man with multiple gummata, one of them affecting the breast. Hennig found gummata of both breasts in making an autopsy of a woman, aged fifty-five years, and who had been for four years confined to her bed on account of syphilitic ulcerations of the knee. Syphilis of the breast, therefore, may appear now as a gumma and now as interstitial induration, as is the case with syphilitic disease of the liver, testicle, pancreas, etc. Lancereaux distinguishes between "syphilitic mastitis" (interstitial) and "gummos mastitis." Of the former he has seen one case, and he, as well as Hennig reports three such cases as given by Ambrosoli. Lang also has seen one such case, and here the parotid gland was also affected, other

signs of syphilis being present as well. Lancereaux reports the case of a woman, aged forty-five years, with general syphilis and disease of the left submaxillary gland, seen afterwards also at the necropsy. Volkmann, under the title "*Cheilitis Glandularis Apostematosa*," gives an account of five cases of catarrhal inflammation of the labial glands, either with or without abscess-formation. Three of these cases were syphilitic. The condition may have arisen by direct propagation *in continuo* from a catarrh of the mouth and jaws.—*E. Wigglesworth, M.D., in Boston Medical and Surgical Journal.*

**THE LOOSENING OF THE TEETH IN ATAXIA.**—The New York *Medical Record* makes a note from *Le. Courier Medical*, of March 6, of the falling out of the teeth, observed by M. Vallin, MM. Luys and Lereboullet, in several cases of locomotor ataxia, not preceded by pain or caries,—a phenomenon due to a bony rarefaction of the alveolar border,—a trophic alteration not hitherto described, but which deserves careful study, as it may be an early symptom of the general disease. Two ataxies now under our own observation present this feature, some of the teeth being so loose that they were merely lifted out with the forceps; one patient realizing no pain at all, and the other scarcely any, on removal of the teeth. It would be well to look carefully into the mouths of all our suspected ataxies.—*Alienist and Neurologist.*

**TREATMENT OF SYPHILITIC NEURALGIA.**—M. Mauriac treats the neuralgia symptomatic of syphilis with iodoform pills, according to the following formula:

R.—Iodoform powder,  $1\frac{1}{2}$  gramme;  
Extract and powder of gentian, q.s.  
Divide into 20 pills, 2 or 3 to be taken daily.

—*Medical Press and Circular.*

**GLYCEROLE OF THYMOL.**—The formula is—

R.—Thymol, gr. xx;  
Glycerinæ,  
Alcoholis,  $\text{aa } f\text{ } \overline{3} i$ ;  
Aque destillat. ad Oj.—M.

Useful, when diluted, as an effective antiseptic mouth-wash.—*Philadelphia Medical Times.*

**EUCALYPTUS OIL FOR DRESSINGS.**—Dr. Schulz, of Bonn, considers that eucalyptus oil offers many advantages over carbolic acid, without its inconveniences. It is a powerful antiseptic, is freely soluble in alcohol and oil, and mixes well with paraffine; its odor also is agreeable. Dressings prepared with this oil are very antiseptic. It may be employed also for spray and washing.—*Medical Press and Circular.*

**A SUBSTITUTE FOR OIL IN SHARPENING TOOLS.**—A mixture of glycerin and alcohol is recommended, the proportions to vary according to the instrument operated on. A razor, for instance, sharpens better with a limpid liquid, as three parts glycerin to one part alcohol. For a graving-tool, or any where the cutting-surface is very small, glycerin almost pure may be used, or with but two or three drops of alcohol.—*Manual de Technique Microscopique.*

## HINTS AND QUERIES.

"He that questioneth much shall learn much."—BACON.

CORRESPONDENTS desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

DOES the use of tobacco—chewing or smoking—favor or retard decay of the teeth?—STUDENT.

WILL some one give the different methods of bleaching teeth with dead pulps, with full particulars, and also tell me why teeth bleached with oxalic acid return to their original color in a few days?—A. F. UU.

I HAVE a case of extreme sensibility of the mucous membrane of the palate. My patient cannot wear any kind of a dental plate, however small, without vomiting being instantly produced upon its introduction into the mouth. All my efforts to overcome this sensibility having failed, will some one kindly suggest a remedy?—J. W.

I HAVE a lady patient, age thirty-five, of nervo-bilious temperament. She is compelled to do all her masticating on four third molars, which in consequence are much worn. The inferior have fillings in the grinding surface, and around the edges of these there is a constantly-recurring sensitiveness on occlusion. I have filled them once and now they are as bad as ever; must I cut away till I reach the enamel? Nitrate of silver, chloride of zinc and glacial phosphoric acid have no effect. Will some one suggest a remedy?—A. F. UU.

WILL some one have the kindness to give an explanation of the following case? About fourteen months ago a young lady of eighteen called at my office, having a left superior bicuspid ulcerated at the root. After treating it for about ten days without any apparent benefit, I concluded to extract and replant it. The tooth was extracted, the root filled with gutta-percha, the cavity with gold, and the tooth replaced. The operation was a success in every particular, the gum adhered to the tooth as firmly as before, and the patient experienced no inconvenience whatever. A few days since the lady called at the office, saying that the tooth had been troubling her for the past month. Upon examination I found no inflammation, but a tenderness on pressure, and the alveolar process was sunken above the tooth as though there was no root. After treating in several ways I decided to extract. I found the root of the tooth about half eaten away and the remainder perforated with holes and having sharp, ragged edges. What was the cause?—N. A. S.

IN reply to W. R. P., in the DENTAL COSMOS for DECEMBER, 1880, a powder known as *streupulver*, composed of three (3) parts salicylic acid and eighty-seven (87) parts silicate of magnesia, is used in the German army as a remedy for sweating of the feet, and may be useful for the hands as well.—S. T. J.

IN reply to C., who desires to know the best way to remove porcelain teeth from vulcanite plates, I would say that I have no difficulty by adopting the following plan, to wit:

First, oil the plate and teeth; then grasp the plate with pliers, and move it *rapidly* to and fro over the flame of a spirit-lamp until the rubber is softened; then, by holding the plate in the left hand, the teeth may readily be removed by



means of a towel held in the right hand. The oil will prevent the teeth from cracking, and they will leave the plate clean and without straining. I think this plan preferable to boiling the plate in water, as the rubber is apt to be less yielding and offers greater resistance to the removal of the teeth, thereby straining the pins.—F. F. DREW, D.D.S.

ANSWER to query (in December, 1880, number of the DENTAL COSMOS) as to the "best way to remove teeth from vulcanite without injury to the teeth or base." Use an alcohol-lamp with small wick, like, for instance, an old-fashioned *fluid* night-lamp, which gives a minute blaze; with that slight blaze heat the tooth or block carefully quite hot, when you can pick it (the tooth or block) off from the base as easily as corn off the cob. Of course, heat again to get the rubber off that adheres to the pins.—E. O. P.

RADICAL PREVENTION OF DARK JOINTS IN VULCANITE WORK.—Always have at hand on the foot or hand-lathe—whichever is used in grinding up—an *even*-surfaced corundum wheel at least a full half-inch thick. Make perfect-fitting joints from lingual to labial surface. Flask in the very best plaster; separate; remove wax; cut grooves for surplus material to flow into; then seize the upper section of the flask containing the teeth and with a *flat* drill (size No. 8, as seen on page 71, S. S. White's Catalogue, 1876). Drill a hole on the lingual side, *close up to each joint*, clear through the plaster. As will be readily seen, this makes a vent for surplus rubber posterior to the joints, and if ordinary care in jointing and packing is observed, it will positively prevent the annoying and much-talked-of dark joints. In hastily-fitted or V-shaped joints, strips of English pink gum, packed therein, will prevent the unsightly protrusion of the darker rubber, and in a measure conceal the defective mechanism thereof.—S. ARTHUR GARBER, D.D.S.

SOMETHING ABOUT METAL FILLINGS.—In conversation with Professor Chas. A. Myer, of Springfield, a few days since, some points with reference to gold and amalgam fillings were discussed which in my own mind have never been quite clear. So far as I have been able to ascertain, the idea is generally entertained that the protrusion of amalgam above the margins of some cavities, after having been filled for a time, is due to an expansion of the material while "setting." Prof. Myer suggests that it is due to the oxidation of some metal or metals next to the tooth-substance—these having become wet before or after the amalgam was introduced, and the accumulation of the oxide under and about the filling causing it to rise, and perhaps in some cases rendering the filling tight. Manufacturers of steam boilers trust to this oxidation of the iron joints for their perfect tightness, and the old fillings of amalgam are also giving us a practical illustration of this fact in a great many cases. It seems, therefore, that this should be taken into consideration in the preparation of the best amalgams. Many of us have also noticed the hard dentine under those fillings which have been in for some time and have recognized it as the calcification of substance in the dentinal tubes; the pulp having been stimulated to resume its calcifying power for its protection from thermal changes communicated by the filling. The question naturally arises, why do we not find it to the same or an increased extent under gold fillings, as gold has a greater conducting power than amalgam? Professor Myer says the conducting power of amalgam is about one-seventh that of gold. We must suppose therefore that the thermal changes communicated to the pulp and tooth-substance by gold are so great that they destroy this vital force which protects the pulp.—EDWARD S. NILES, D.M.D., Boston.

THE  
DENTAL COSMOS.

VOL. XXIII. PHILADELPHIA, FEBRUARY, 1881.

No. 2

ORIGINAL COMMUNICATIONS.

RANDOM THOUGHTS ABOUT FILLING TEETH.

BY D. VAN DENBURGH, SAN FRANCISCO, CAL.

It might have been supposed that in half a century men of so much skill and judgment, and so bent upon progress as a majority of dentists have been, would have settled upon the best theory and practice for apparently so simple an operation as filling decayed teeth with gold. Perhaps haste for improvement has not allowed sufficient time to note and compare results, and to test what is best. At least there seems to be a breaking-up of theories and practices which have been in fashion for some time, and there are indications that a too easy adoption of other theories and practices will also, in the end, be likely to lead to disappointment.

It may be interesting to review in a general way—considering principles more than the minutiae of practice—some of the older methods, in which, perhaps, we may find some good points which have not received the attention to which they are entitled.

All have recognized the cohesive quality of gold as a decided advantage. In the older practice, illustrated by such work as that of Parmly and Harris, welded fillings may, no doubt, be found; but this result was accidental. Wedging and the binding shape and strength of the cavity were relied on to secure solidity and exclude moisture. Under favorable conditions good work was undoubtedly made in this way, as some of it yet remains to testify. But the range of excellent work was limited and success was not so easy of accomplishment, or so well assured.

With the recognition of the cohesive quality of gold, used dry, and with the smooth sides and sharp angles of smaller instruments, the necessity of wedging with great force was avoided. By packing towards the sides of the cavity, in any or in all directions, solidity and close adaptation to its wall were attained as the work

progressed; time and force were saved, and good results were attained even in cavities of undesirable shape or position, of weak walls, or even where a portion of the wall was missing.

This method was well illustrated by the work of Townsend, Westcott, Dunning, etc. There was much that was excellent in the work of these men and others of their class, but the improvements introduced by them seem to have never received the general recognition they deserved, or to have been overlooked in the effort to make the most of the quality of cohesion. The possibility of making welded and hard fillings seems to have overshadowed other qualities that are really more important. In this way the use of sponge, crystal, and extra-cohesive gold was carried to an extreme that has perhaps done more harm than good.

The great value of plastic fillings is in their easy and perfect adaptability; but soft gold foil has a pliability that it seems no great exaggeration to call semi-plasticity. We all know, who have used it, how, under favorable conditions, it seems almost conscious of our object, and willing to second it. It packs beautifully. Why should we sacrifice this desirable quality unless some other, equally valuable, is gained? Good, pure, clean, soft foil has abundant cohesiveness for any filling confined within cavity-walls. It will make fillings that will neither crumble nor wear away. Its great excellence is that it packs easily, and welds only when perfectly packed. Extra-cohesive foil welds at the first imperfect contact, hardens, and resists compression. This stubbornness of very cohesive foil is of no value in any way, and, as it must be accompanied by greater difficulty in attaining solidity, it becomes a disadvantage. Undoubtedly, cohesive preparations of gold are worked by many with great skill and beautiful mechanical results. There is to some an attractiveness in the ingenious appliances required to aid its use. By applying more machinery, more time, and more skill, the mechanical ambition of some has been gratified; but complications are not necessarily improvements. Putting difficulties in the way of success, however skilfully they may be overcome, can hardly in such a case be thought desirable. Nearly all cavities are (or at least ought to be) sufficiently surrounded by walls to securely hold a filling, and if in such cavities gold is to be placed, every argument points to the use of soft foil.

The extra-cohesiveness of gold is useful only where it is to be built outside the cavity-walls. Here, by the aid of hammer and punch, in one or another of their forms, results are attained that soft gold worked with hand instruments cannot equal. Where such work must be done, this way to do it may be accepted. But it will be well to consider the drawbacks and the difficulties of this



manner of operating. Mallet-force can be applied only straight forward, and the gold must be packed from the bottom of the cavity towards the top. This is an undesirable limitation of the direction of force, and compels a preparation of the cavity so that all parts of it may be open to such direct action. This, of course, is a necessity in some positions, especially where teeth are much broken, and the dentist in such cases is not answerable for the exposure of his work and the loss of tooth-substance. His hammer and punch are here conveniently used, if gold is to be substituted for the lost portions; but surely we ought not to adopt such a system as makes it necessary to break down a considerable portion of the tooth, and expose our work in order that we may continue to use inconvenient appliances.

It is to be feared that some of us have been led away from discretion and good judgment, and have fallen into ways of operating for which even great skill cannot compensate. With hand-instruments gold can be packed in any direction, with almost equal facility, and the tooth so shaped as usually to conceal the filling from external view, at the same time permitting the most favorable forms and relations for subsequent cleanliness and durability. What barbarous exhibitions of enamel cut away and gold glaring in its place are every day seen where no break or mar need have been visible, and for which there can be no excuse but the supposed necessity of using the punch and mallet!

Not long ago I had a call from a young man who said he had been educated as a dentist at one of our popular dental schools, and that he had never seen a tooth filled except with an automatic mallet, which, in his opinion, was the greatest improvement of modern times in dentistry. This, if true, was probably more the fault of the young man than of any one else; but it illustrates the narrow and one-sided ideas that have too much prevailed. We have even tried to persuade ourselves that such work is ornamental and beautiful, as a sop, I suppose, to a troubled conscience. What delight and pride our friends of Central Africa or of the South Sea Islands might derive from gold teeth I cannot say, but with them it would seem more appropriate. It is hard to understand why civilization tolerates such esthetic blunders. Filled teeth should not be considered as articles of jewelry worn for personal adornment. If there is no better way of repairing them than to build them up with gold, let us do it with regret and humiliation that we cannot do better, and not try, like the unfortunate fox, to establish an unnatural fashion. Let us change the practice, though we dim a trifle the glow of our pride in manipulating gold.

For a quarter of a century we have been improving the little art

of filling teeth with gold. Innumerable appliances and new methods of working have constantly been pushing one another in and out of use, so that we have thought more of the means and less of the objects and results of our work. The pride we have felt in our skill has possibly obscured our judgment. We desire to be of service to our patients by preserving their teeth. Operative skill alone will not do that. We have been going ahead very fast in the last twenty-five years, but will any one who knows the facts dare to say that we are doing very much better now than the best of our profession were doing before that time? The rage for brilliant operations seems now to have brought us around the little half-mile course, and we are getting ready to start again. Let us hope that we may have learned something by experience. But let us not be in too great a hurry in our new departure. It is not gold, nor amalgam, nor gutta-percha that will prove to be the winning hobby. In such a race everything depends upon the rider, and it is possible that some may stand still and yet go farther than others who make haste.

No doubt skillful operators are more numerous than they used to be, though we have inefficient ones yet; but it seems almost a waste of energy that so long a time should have been almost wholly taken up with an incidental accomplishment from which, after all, we have gained so little. Suppose that thirty years ago some beneficent or malign power (whichever you please) had prohibited dentists from ever filling a decayed tooth: we may admit that something would have been lost to the passing generation, but is it not easy to conceive that we might, and probably would, have found some better means of preserving teeth, that would have been of vastly more service to the coming generations than any we now possess? We have not studied the means of preserving teeth. We have been so hard at work filling them that we have had no time for anything else. We have done our work so beautifully that it would seem impossible that an appreciative tooth could ever again fall back into the vulgar habit of decaying; but they have not always shown a proper regard for our feelings. We have acted like the Western doctor, who gave as his reason for administering so much quinine that he "hoped to drive the fever and ague out of the country," and now we begin to suspect that we cannot frighten away our plague with all the noise of our hammering or the glitter of our golden images. Let us not despair, however; we have yet a whole cargo of "plastics" that have not been sufficiently tried. Of course, we must believe that the virtue we are seeking is in some of them. I have a bowing acquaintance with a distinguished physician who treats his patients so skillfully that ever afterwards they may neglect the laws of

health with impunity, and triumph over all the evil influences and accidents that might otherwise have brought them to their graves. So we must not rest until we have found some filling that will make a tooth invulnerable. Disgusted by bad practice, and led astray by unwarranted and foolish inferences, amalgams have been denounced by a part of our profession without an effort to ascertain their real merits. Now, disappointed by too great a reliance upon gold, amalgam is beginning to be recognized as a useful servant. But we do not like to call it by its right name. Now that "science" has taken it in hand, we call it gold and platinum alloy. Have we forgotten the royal mineral succedaneum?

New departures are always commendable when they are departures from evil. There was once a man who cast out his devils and garnished his house, and was all ready for a new departure, but "the last state of that man was worse than the first." A great desire for new things is not always the result of a full appreciation of what is already at command; and it is curious that so many of us should be afflicted with this inordinate desire—understood to be the true spirit of improvement, I believe. Our friends of the "New Departure" complain that they are denied credit for anything new, and perhaps they have been unjustly dealt by in this respect, if the three-legged stool of "basal principles," announced as its "life" ("Food for Thought," DENTAL COSMOS for October, 1880), correctly represents it. I think it has been truly said that its friends suggest nothing new in practice, but in theory, certainly this "tripod" of principles is very new, very bold and startling, and so unsupported by any facts or evidence, direct or inferential, that it *seems* ridiculous.

Consider the first leg: "Compatibility of filling material with tooth-bone is the foundation of successful practice." We may infer from this that fillings are sometimes incompatible with tooth-bone; and this is intended to mean that such fillings *cause teeth to decay*. Well, we need not go far to find substances which will cause teeth to decay; but that we have been selecting just such to fill teeth with, in the hope of arresting decay,—that is a new idea, and rather a funny one; a good antithetical point for a joke, but rather sappy wood for the best leg of a tripod which is meant to support a great load of science. "In proportion as teeth need filling, gold is the worst material to use." This is leg number two, and I am afraid it is rotten. As for number three, "A filling may be the best known for the tooth, and yet leak badly." That completes the brand-new standards—sappy, rotten, and leaky—poor material, but a good enough support for an oracle. The "basal principles" of oracles we know were never sound, or only sound,—which was it? It is hard to remember all about oracles.



It is said that some of the medical gentlemen who believe in the theory that like cures like, and that the more infinitesimal the dose the greater the benefit, treat their patients as successfully as if they had never heard such delightful nonsense. So our "New Departure" friends may practically do better than their principles would indicate, and also serve to remind some of us that there are other materials than gold useful in tooth-filling; but it is a pity we cannot have more moderation. The ends of the "teeter"-board are no doubt the jolliest, but the middle is the best place to think.

After all, is it more extravagant to say that fillings induce decay than that they prevent it? Yet this is the idea of a large majority of those who employ dentists. It might be interesting to discover the origin of such a misconception, if it were possible. Surely dentists will not claim to have suggested it. If this idea could be taken out of some people's heads, their teeth would be more likely to stay in.

To teach how to prevent decay ought to be considered a higher aim, and should be more profitable to the dentist than to repair such as have been injured by it. To his patients, also, this would seem the most valuable service the dentist could render.

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### SOME OF THE CAUSES OF LOSS OF THE TEETH IN THE ADULT— A REPLY TO PROFESSOR ESSIG.

BY GEORGE A. MILLS, BROOKLYN, NEW YORK.

(Abstract of a paper read before the First District Dental Society of New York.)

IN the November number of the DENTAL COSMOS there appeared a paper by Prof. Charles J. Essig on the topic indicated by the above title. While finding in the article referred to some things to commend and some open to criticism, I am glad that the topic is being discussed. I have carefully read everything which has come to my knowledge upon the subject, and find myself far from accord with much of the teaching.

Prof. Essig seems to consider that the term "Riggs's disease" applies only to the loosening of teeth by reason of caries of the alveolar investment. Dr. Riggs claims, however, as I have previously written, that all phases of the disease in question are but different stages of the same trouble. Dr. Essig considers it an unsettled question whether the death of the part named is due to some cause peculiar to the alveolus, or is merely a sequence of the death of the connective membrane by which the function of the bone is suspended. It seems to me that a careful study of Dr. Bödecker's articles on inflammation of the pericementum would result in a

positive conviction in regard to this matter. I am well aware that there are differences of opinion regarding the primary cause of the disease. I claim, with a profound conviction of the correctness of my position, that the cause is systemic; that the deposit is only a local manifestation.

In reply to Prof. Essig's assertion that he has never seen a well-marked case in the mouth of a person under maturity, I can state that I have seen it not infrequently in the mouths of youths—generally as a sequence of one of the eruptive fevers. Too little attention has been given to this liability, and many cases which might easily have been cured in their first stages are by neglect allowed to proceed to such an extent as to be almost uncontrollable. I do not by any means accept the proposition that age is the only factor, but believe that various influences, physical and mental, are oftener than is thought powerful abettors of the disease. Conditions of nervous exhaustion may exist at certain periods of life, permitting the local expression of a disease which altered circumstances in after-life may radically modify.

Dr. Essig thinks that the expression is caries, because of the sanious character of the discharge and its peculiar odor. I am not aware of any difference of odor arising from this particular lesion from that caused by the corruption of any animal tissue. It is not the result of inflammatory action on the osseous structure, but on the living matter in it, which is wept out, leaving a residue of the mineral portion of the bone. This product, coming in contact with the oxygen of the air, produces a sulphureted hydrogen, which accounts for the odor.

Prof. Essig speaks of precursory signs which he observed in the mouth of a patient, and which he watched for more than ten years. The want of knowledge manifested by this admission is by no means confined to him, but exists generally throughout the profession. This first expression of the disease is the time for successful treatment, and when this fact is better understood we will not see so many chronic cases as we now do. The profession is "at sea" so far as principles are concerned, and too many are more anxious to be told what to do than why. This is the trouble with most public dental clinics. Men are too apt to say, "I do not care to listen to a lecture on the subject. I want to see how to treat the case." It is not strange, therefore, that these men return and say, "I did just as you told me, but met with no success."

Prof. Essig has called attention to some of the exciting causes, which in the main I believe to be quite correct. Of the acute forms he notices an expression which is not generally accepted,—the appearance of abscess without the death of the pulp. I have

noticed this fact frequently in my own practice. I have a case now under treatment in which an abscess had formed in the cheek just under the prominence of the malar bone, "breaking" on the outside. Its source was in the socket of the anterior buccal root of the first superior molar. I decided, on examination, to extract the tooth. The pulp was dead up to the junction of the bifurcations, but alive in the remainder of the tooth. Did the abscess cause the death of this portion of the pulp? I think it did, and this view is in accordance with Dr. Bödecker's investigations before referred to. I do not regard even such a case as I have described as under all circumstances without the pale of effort to save. It has been proved in practice that the amputation of a root under such conditions will remove the local effect, and leave enough vitality in the remainder to secure firmness, admitting of continued usefulness.

As to the etiology and treatment of the disease in question, Prof. Essig considers that the former is so obscure that the latter is necessarily only of a palliative character. So far from accepting this conclusion, I consider that enough is known of the etiology to warrant something more than merely palliative treatment. Marked beneficial effects are being secured by constitutional treatment conjoined with the surgical. Remedies can be intelligently addressed to the systemic needs with a local response, proving their adaptation to the case. It is only a truism to say that the etiology is to be found in nervous degeneracy; that whatever contributes to the reduction of nerve-force aids the local degeneration. The predisposing and exciting causes are various. Heredity is justly accountable for a large controlling influence. In such cases, even with tolerably favorable surroundings, the inherent predisposition will allow of a disturbance of harmony by causes which, but for that proclivity, would not be sensibly manifest. On the other hand, one in whom no hereditary tendency exists, may, by reason of overwork of body or mind, or both, be made liable to results similar in all respects.

Prof. Essig takes exception to the indiscriminate scraping which seems to be regarded by many as the remedy *par excellence*. I am not aware that any such treatment has been advised. If, as Prof. Essig says, the employment of dilute sulphuric acid serves the purpose so well, why not depend upon it altogether to the exclusion of instrumental aid? I know the value of the acid treatment in connection with the instrumental, but let no novice be deluded into the thought that it is all that is required; for, if there is any deposit that defies the acid treatment, it is that which is so commonly found in the pockets, and which is so vitreous that you



might as well expect the acid to act on glass. I do not imagine that Prof. Essig has ever seen the Riggs scalers employed by an expert. The use of the mallet, of heavy gold, and the effort to save inflamed pulps are all open to criticism and condemnation, but it makes all the difference in the world how and by whom such instruments and materials are employed, and by whom such efforts are made. Ability among us is all the way from A to Z, and special ability only comes by special concentration and special practice.

I am glad that Prof. Essig has written on the subject, and hail every contribution that tends towards a more intelligent recognition of the destructive effects of this lesion, and to more definite conclusions respecting its etiology and treatment.

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## CLINICAL REPORTS.

### PHILADELPHIA DENTAL COLLEGE—HOSPITAL OF ORAL SURGERY.

CLINICAL SERVICE OF PROF. J. E. GARRETSON, M.D.

REPORTED BY WILLIAM C. FOULKS.

CASE I.—Patient, young lady. Lesion, a pus-discharging opening through the left antrum into the socket of left superior second bicuspid. Cause, periodontitis running into abscess, terminating in absorption of the adjacent portion of the osseous parietes of the antrum. The lady, a private patient of Dr. —'s, had asked his advice and assistance. Upon making examination of her face at the first visit he found a marked swelling over the left canine fossa; also a slight protrusion of the eye above, in which organ, from his patient's statement, there existed a feeling of fullness and pain, varying in degree according to the inclined or erect position of the head, being most painful in the former. A slight discharge of mucus and pus through the left nostril into the middle meatus was observed to follow direct pressure applied to the tumor. Inspection of the mouth discovered the left superior second bicuspid loosened in its socket, consequent upon nature's effort to throw it off. Such effort was expressed in the oozing of pus from around the neck of the organ. Here, evidently, was a starting-point. But how start? How proceed? Was it proper to try and save the tooth? It was deemed useless to make the attempt, any assistance in this direction, except extraction, being plainly contra-indicated. Accepting this as true indication, the tooth was extracted. Its removal was followed by a flow of pus from the socket. After this operation his patient expressed herself as feeling "much relieved from the sense of fullness

and pressure existing prior to extraction." Subsequent treatment failing to abate or sensibly control the discharge from the antrum, Dr. — brought his patient to Prof. Garretson. Having listened to the previous history of the trouble, given by Dr. —, Prof. Garretson diagnosed the cause and condition as set forth in the opening of this report. He then proceeded to a general consideration of "lesions of the antrum" as viewed from a dental stand-point. The following is a brief *résumé* of his remarks:

"Gentlemen,—Time and again, in your future practice, the responsibility will be thrust on you of treating pathological conditions of the maxillary sinus. In respect to causes of these I will name and explain to you two which I am led to consider, after many years of experience and practice in oral surgery, most common. These are, first, lesions associated with diseases of the teeth; second, lesions common to mucous membrane, modified and influenced by situation. I am fully aware that other sources of derangement or disease exist, but for the present we will consider the aspects alluded to.

"First, the relations of teeth to the antral cavity. This refers to penetration of the sinus by roots. It is not uncommon to find the apices of molar roots, one or more, and especially the palatal of the second, or twelfth-year, penetrating the antrum, thus establishing direct communication between the parts by continuity, both of enveloping membrane and osseous parietes. Under such conditions the sinus is peculiarly liable to irritation and inflammation having primary origin in dental disturbance. Such relation between antrum and teeth is always to be taken into consideration in lesions of the cavity. Diseases of the sinus are found more or less amenable to treatment as there exists or not constitutional predisposing vice or weakness. A simple irritant alone (such as an inflamed pulp or periodontium) in itself and relations may be easily controlled by the ordinary applications directed to such conditions. But, as I have told you before, as the removal of a torch which has fired a dwelling will not prevent the subsequent conflagration of the structure, just so will the extraction of an abscessed tooth, or the attempt to quiet an inflamed pulp (where constitutional predisposing cause or causes exist), be of little benefit, unless systemic complications be justly appreciated. This appreciation is only to be acquired through study, experience, and observation.

"It is not every one, however, having a dead or diseased tooth, the roots of which penetrate the antrum, who has secondary inflammation of the sinus as the result, there being a difference in the resistiveness of the vital force of individuals.

"Such difference of vitality you are *here* instructed to consider, especially in the treatment of the several classes of teeth, as well

as in the various functional and structural diseases of the head, face, and neck with which you may have to do in office-practice, If you will pardon the digression, I would say just here, that if you desire to erect a dental mansion that will shelter and protect you through a professional career, observe the following plan: dig your cellar in *physiology*; lay the foundation from *anatomy*; erect upon this a structure of *pathology*; fasten and cover the whole, inside and out, with the cement of *principles*; and save only through the failure of *laws*, such a building, like the Rock of Ages, will resist the storms and winds forever. Lacking such foundation principles, you build on shifting sands.

"Let me impress on your minds the importance of grasping *principles*. Let the word in its full meaning and signification be ever present with you, so that your future studies and efforts may *not* be without system or purpose. Master principles and the *minutiae* will take care of themselves.

"I come back now to the subject from which I digressed.

"Few are found among humanity having no congenital or acquired functional or structural weakness. Therefore you will recognize that as a rule, in your professional duties and relations to your patients, systemic complications must receive due consideration to obtain the best results.

"To understand such complications you must familiarize yourselves practically with pathological expressions.

"Remember, the *study* of your profession is not merely that of the hours, months, or years of your collegiate course, but that it is to be bounded (if you wish to accomplish the greatest good) only by the stillness and inactivity of the grave. Carry that thought home with you. . . .

"How roots penetrating the antrum may involve it, because of their diseased or irritated condition, I mentioned. A greater number of teeth, however, are not so associated, part with part, but are, as you know, separated from the sinus, by a bony septum. In such cases inflammation of the antral cavity from diseased roots may be regarded as the exception rather than the rule, and *when* resulting, may generally be traced to periodontal abscess.

"How, then, you will ask, does an abscessed root unassociated with the cavity involve it? After this manner: the sack, or bag of pus at the apex of a root gradually enlarges, exerting considerable impression upon its surrounding osseous parietes. Pressure causes absorption.

"This double process of absorption and pressure goes on until the weakest portion of the circumferential wall gives way, venting the contents of the abscess, thus establishing, through a fist-



ulous opening, equilibrium. You have all seen such openings upon the face, chin, throat, etc. Sometimes, however, the osseous partition between the diseased root and the antrum breaks down. Here the discharge of the abscess is directed into the *sinus*, which cavity soon expresses irritation and inflammation, consequent upon the presence of foreign matter.

"The apex of the second bicuspid root is situated just in front of the anterior inferior angle of the antrum, and is separated from the cavity by a septum of bone, which varies in thickness and vascularity in different individuals.

"From this point our attention may be directed to a consideration of the case of this young lady who is before us to-day. Such consideration must be limited, as other cases claim our attention. I will presume that most of you are familiar with the pathological expressions and changes of the tissues and fluids as connected and associated with *perversion of the circulation*, or *inflammation*. Weakness and atony are apparent in the appearance of the patient. Stimulating tonics are indicated in this direction. The fistulous opening into the antrum is (as you see by passage of my probe) by way of the socket of the second bicuspid tooth which Dr. — extracted. Here, in the sinus, we want a local tonic and astringent stimulant. Dilute chloride of zinc, I think, will meet the requirements. We will direct that the established fistulous outlet be maintained by the introduction into the orifice of a small tent of cotton, saturated in phénol sodique; the cavity to be syringed daily with the zinc solution. We will ask Mr. McN—— to take charge of the patient, to follow directions as given, using his judgment, and report condition of patient at next clinic."

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## PROCEEDINGS OF DENTAL SOCIETIES.

### NEW YORK ODONTOLOGICAL SOCIETY.

REGULAR meeting held at the residence of Dr. W. A. Bronson, Tuesday evening, November 16, 1880.

President Dr. W. A. Bronson in the chair.

Dr. W. H. Dwinelle. I was appointed on a committee to present a report expressive of the sentiments of this society in regard to the death of Dr. Robert Arthur. Before I read the report I would like to make a few remarks. Dr. Arthur's relation to me was a very peculiar one. He was born the same year, the same month, the same day, the same hour that I was. He was peculiar to me of all men of my acquaintance in that respect. So, for many years knowing this, our relation has been peculiar, as you may well

believe. I regarded him as a sort of twin-brother; a brother in the better land I trust now. It brought us together in many peculiar ways. He used to call me his brother at times, and we had many pleasantries in connection with it, and when our birthday came round there would be interchanges of congratulations between Dr. Arthur and myself. The last time I saw him was when he was here at the invitation of our society and we were discussing the little matter of our life and death, and the query went from mouth to mouth as to who should go first. I do not know why, but he said he felt confident that he should take the lead of me in that respect, and time has shown that he was correct. Hail, brother, and farewell!

The committee appointed relative to the death of Dr. Robert Arthur made the following report:

The intelligence of the death of our beloved friend, Dr. Robert Arthur, came to us very unexpectedly, throwing another cloud of sorrow over us, reminding us anew of the many times we have of late been called upon to mourn the loss of those most noble and eminent in our profession.

The time is so short since he was with us, the guest of our society, entertaining us in his genial, instructing, and pleasant way, that it does not seem possible that we shall never see him again and that his voice is hushed to us forever.

Dr. Arthur's relations to our profession were in many respects peculiar, even representative in their character. Upon him was conferred the first degree by the first college of our specialty, and from the first hour of its bestowment he has ever reflected honor and credit upon it.

Few men, if any, have brought to our calling such rare qualities of mind and scholarly attainments as Dr. Arthur. His various works pertaining to our art, his translation of foreign authors, and his many and valuable contributions to our journals attest this. Most of them will take their place among the permanent literature of our profession. No man had a deeper interest in dental education and the advancement and improvement of our profession. His life has been contemporaneous with the best life of our profession. He was essentially one of its oldest members, and we feel that it is an irreparable loss to us that he has been taken from our midst; we need every installment which, had he been spared, would have been given us from the rich store-house of his large experience and rare wisdom.

Honesty, integrity, courage, conscientiousness, even to the martyr-spirit, were his leading characteristics; he leaves behind him an example in these respects worthy of all imitation.

While bowing in submission to the divine dispensation which has taken from our midst our dear friend, Dr. Robert Arthur, and while keenly appreciating our sorrow, we do, as a society, extend to his afflicted family our most sincere expressions of sympathy and commiseration.

#### INCIDENTS OF OFFICE PRACTICE.

Dr. C. E. Francis. A patient recently called upon me, saying that she had a friend who desired to have a tooth transplanted in place of a broken central. I told her that I had never transplanted a tooth, and that I did not look upon the practice with much favor. If there is any gentleman present who practices transplantation, I shall be glad to give her his name.

[No response.]

Dr. Benjamin Lord. Nothing in my office-experience during the last two years or more has attracted my attention so much as to find so many teeth decayed on the approximal surfaces that to all appearances were quite sound; in very many cases I failed to detect the decay without making a separation. I was led in a great measure to this discovery when separating or shaping the teeth that I supposed were sound, in order to prevent decay on the surfaces that are naturally in contact. This experience has tended to confirm my conviction, more and more, of the importance and value of shaping the contact-surfaces of the class of teeth that are predisposed to decay, while they are yet sound; so that these surfaces will be self-cleansing, or be quite readily cleansed.

We find, as a rule, that the teeth become decayed on the approximal surfaces owing to their shape,—all things being equal,—that is, in the same mouth, the teeth that are so shaped or are so situated in the arch that the surface in contact is very slight, do not decay, whereas those that are so shaped or situated that the contact-surface is considerable, do decay. Does it not follow, then, that certain shapes favor decay and certain other shapes favor cleanliness, and hence do not encourage decay?

That the artificial shaping, so as to meet the demands of the case, is quite feasible, without making the teeth in the least sensitive, and that it ought to be done to a large extent, I firmly believe.

Judging from my own experience, and observation as well, I am led to the conclusion that one-half of the teeth that are passed as quite sound are already decayed on the contact-surfaces.

In this shaping-operation we should not break up or destroy the whole of the surface in contact, but should leave a point, either at the necks or at the ends of the crown, depending upon the shapes of the teeth as we find them. It is only proposed to situate



or put the teeth in a condition to favor cleanliness, so that decay shall be so far prevented.

Dr. Mills said in Boston last summer that cleanliness was the bottom plank of success in the salvation of the teeth, and no doubt there is great truth in the sentiment, for we may say that decay is prevented in proportion as the teeth are kept clean. I see so many cases where the decay could have been prevented, with all its attendant troubles, by a timely separation, which would have occupied but a few minutes and given no pain, that I could wish I might live my life over again, that I might be of so much greater service to those who chanced to fall into my hands.

It is not held that this shaping-operation prevents decay invariably, as some teeth do or will become decayed, even on the exposed surfaces, with the care which they ordinarily get. Nor is it contended that all teeth require this treatment. Some teeth are so dense in their structure, and are so little subjected to the primary causes that they do not require even ordinary care in cleansing; but these are exceptional cases.

It may be said that the strongest point or consideration in thus freeing the teeth is the securing of cleanliness, as it cannot, or perhaps rather, will not, be sufficiently secured without it. Then, if we do find that decay has already taken place, we not only have the cavities at great advantage when they are small, but we are able to control the shapes of the spaces for the most part, as in quite sound teeth. I will here say, without going at all into the subject of filling, that I believe a great cause of further decay on the approximal surfaces, after being filled, is that the condition that favored the decay is not changed, or broken up, and the teeth left so that they will be self-cleansing, or, at least, be readily cleansed. And it is here, in my judgment, that the theory of the incompatibility of filling material comes in, or, rather, the fallacy of it.

Dr. Frank Abbott. I wish simply to show and explain to you some cases I have had under treatment which have been—to me—extremely interesting, and I have no doubt they may be, in a measure, to some who see them and hear the explanations. A lady patient, who was in the country during the summer, had the misfortune to be thrown from a carriage, striking upon the right side of the lower jaw, in the region of the canine tooth. The jaw was thrown to the left, and, to all appearances, had a fracture near the angle on the left side. There was a fracture between the canine and lateral incisor upon the right side. She was taken to a friend's house, and a surgeon—quite an eminent gentleman in Philadelphia—was telegraphed to come and attend her. He came, and did, I presume, what a good many surgeons would have done, viz., bound

her head up with bandages as tight as he could, tied her lower jaw in its place as nearly as he could, and left matters to take care of themselves. At the end of five weeks he took the bandage off and told her she was as well as she ever would be. She stayed at her friend's house some two weeks longer, then came home, and immediately came to my office and made an appointment. This was about the first of September. I saw her at the time appointed, and upon examination discovered that the fracture on the right side had not healed. The pieces were loose. If there had been a fracture upon the left side near the angle, as I concluded there had been,—for I could account for the one-sided appearance of the lower part of the face in no other way,—it had healed apparently as firmly as it ever was. On account of the moving of the parts she was unable to masticate, and consequently was unable to take anything in the way of solid food. After carefully looking the case over, and consulting with a surgeon in this city in reference to her physical condition, it was decided that the best plan to follow was to return the parts to as nearly their normal position as possible, by the easiest and most careful means possible, and retain them in position until they had united.

That was the treatment adopted. I have the little apparatus here, showing what the work was done with. The operation consisted in taking an impression of the lower jaw, as perfect as we could get it, making a cast and set of dies, and striking-up a gold plate. This was used instead of rubber for two reasons: First, because it is a conductor of heat and cold. Second, it could be placed in position more easily. Across the anterior part of the mouth a jack-screw was fitted, and a cut made in the plate, as you will see, so that a portion of it might be moved independently of the rest. With this the parts were readily placed in position. The question now was, how to hold them there and prevent the right side from tipping out too far. Fortunately a molar was missing upon one side and a bicuspid upon the other. Through these openings I passed a piece of wire, the ends of which were soldered to the plate. This was bent in the form of a hook. The apparatus was now ready and was placed in the mouth. By turning the jack-screw a very little each day for four or five days the parts were adjusted. The ends of the wire were then fastened around the outside of the teeth by means of a piece of small platinum wire, and thus the parts were retained immovably for five weeks. When the apparatus was removed, to the great delight of the patient, it was found that a firm union of the fractured ends had taken place. By grinding off prominent points of the molars and bicuspids and forming inclined planes, the jaw was gradually worked around to the right, so that something approaching the original "bite" was obtained.

The casts of the mouth, both before and after the work was done (which I now pass around), will give you, perhaps, a better idea of what was accomplished than my explanations. I would say, further, that during the time the patient was wearing the apparatus she very faithfully rinsed her mouth from six to ten times a day with antacids and anti-fermentative washes; consequently the teeth suffered very little. I wish, in this connection, to tender my sincere thanks to Dr. K. C. Gibson, of this city, for valuable suggestions and assistance in the treatment of this case.

I have another case that has been one of interest to me. I have brought some of these little specimens to show to a certain extent what has been done. Last March a physician called upon me and wished me to go to the house of a friend, a clergyman, by-the-way, and see him in consultation that evening. An hour was appointed, and I called, when, upon examination of the patient's mouth, I found pus discharging from around all the teeth in the lower jaw. In fact, the lower jaw seemed to be a mass of pus,—worse than I ever saw in any other mouth in my life. He was in such a state physically that he hardly knew his wife, physician, or any one else. He could just keep himself up with a great deal of assistance until I could make an examination. After looking the case over carefully, I told the doctor I feared he would lose the teeth (as one or two had dropped out already), and the alveolar process of the lower jaw entirely. The possibilities were that some of the teeth might be saved, but it looked as if they would all be lost. I advised him as to the treatment. He went on under my advice, and after ten days the gentleman presented himself at my office. I looked at his mouth, and, to my astonishment, found it, if anything, worse than when I first saw it. I was then fearful that he would lose the entire maxilla. The patient's general health, however, had improved, the pain had subsided, and he was quite himself again. The special point which I wish to call your attention to, is the treatment of the case systemically. Iodide of potassium was first given in doses of five grains three times a day, but after two or three days it was found that he could not take it without being a great deal disturbed—more than his physician thought he ought to be in his condition—and he stopped it. He then concluded to try iodide of calcium, as it was necessary to get the stimulating effect of iodine, and the well-known effect that calcium exerts on pus-producing surfaces was also desirable. He commenced giving him five grains three times a day, and in a very short time—a week or ten days—the diseases seemed to have subsided; a line of demarkation appeared to have been set up between the dead and the living bone, and it seemed likely that a portion of the jaw, at least, would be saved alive. When I saw



him again, which was a week later, I suggested the giving of ten grains three times a day, which was done, and the patient improved very much faster than he had upon the smaller dose, so that the amount of pus discharged after that time was very much less than I had supposed possible under the circumstances. After a week or ten days the smaller dose was resumed. He went on with that three or four months. This fall, since I returned from the country, I have operated, and I have the results of the operation here.

The bone came with all the teeth I removed, except one which was ready to drop out. All the front teeth came away with the bone itself, which consisted of the alveolus and a portion of the maxilla.

It will be seen, from the large piece taken out, that nearly all the incisors, the canines, and, I think, on one side, one bicuspid came away with this one piece. Upon each side of his neck and at one or two places under his chin pus was discharging. His face upon one side commenced to swell about a month since, from some cause or other; whether he had used his mouth too much in speaking or in attempting to masticate I do not know, but quite a swelling had commenced upon the right side over the ramus of the jaw. Knowing that a further destruction of tissue was to be avoided, if possible, it was thought best to return to the large doses of iodide of calcium. It was quite surprising to observe the very sudden effect produced. In some three or four days the swelling almost entirely disappeared. This was the more remarkable from the fact that the swelling seemed to be filled with pus, to the extent of perceptible fluctuation under the finger, and that no discharge had taken place.

Dr. A. H. Brockway. What was the occasion of the trouble?

Dr. Abbott. I will sum that up in a very few words.

Some ten years ago the pulp was destroyed in a wisdom tooth, and the tooth filled with amalgam. This tooth served its purpose and gave no trouble until the 6th of March last, when it became sore to bite upon and a little painful. A dentist was applied to, but he did nothing, telling the patient that the tooth was too good to lose, and that the pain and soreness would probably soon subside; instead of which it increased so rapidly and to such an extent that on the 8th, two days later, another dentist was sent for, who immediately extracted the tooth. This, it appears, was too late, as the inflammation had already spread over so large a territory that the removal of the tooth and the subsequent hemorrhage were not sufficient to check it. On the 10th, two days later, the patient became delirious, and continued in that state until the 23d. On the 27th, four days after he became rational, I was called to see him, and

found him in the condition just described. The cause of the rapid progress of the inflammation and the eventual loss of so much of the lower jaw and its attachments would, perhaps, be attributed to a syphilitic taint, but I am assured by his physician that there is no evidence of such taint; it may be accounted for in the extreme anæmia and generally low physical condition of the patient, brought on by long-continued hard work.

I should have said that the treatment of this case, locally, consisted in washing it every day with a weak solution of carbolic acid and water. He has now a comparatively well mouth,—so well that last Sunday he preached for the first time, and his congregation and himself were highly delighted.

Dr. W. D. Tenison. I had a case very similar to Dr. Abbott's, and he saw it before I commenced treatment. The difference was that my case was that of a female, and I speak of it now as showing the sympathy of the uterine organs with the oral cavity. It was a young girl, about seventeen years of age, of robust habit, a servant-girl, who was brought to me by a servant of mine, and I was requested to examine her mouth. I found an opening over the central tooth discharging pus. The face was very much swollen, the swelling extending into the center of the roof of the mouth, and the teeth were just as though they stood in a mass of jelly. She told me that for several months she had gone to the infirmaries, and had had the abscess opened from time to time. It took me some time to find out the cause of the trouble. It was an injury she had received,—a blow which struck the central tooth. I noticed a scar on the lip, and upon asking her how it came there, she told me a dumb-waiter being lowered struck her on the lip. It was on a line with the central where the discharge commenced. The feature of interest to me was the fact that she had menstruated but once before she received that injury, and from that time she had not menstruated, nor did she until she was cured, when her condition became normal. The treatment was similar to the treatment that Dr. Abbott's case received. I saved the central and wisdom teeth, but the rest were lost,—coming out with the bone when removed.

Dr. Bogue. I have received two communications on the subject of our last meeting, and if it be the pleasure of the gentlemen I will read them. The first is from Dr. W. N. Morrison, of St. Louis, whose answer to the questions that were asked him was not in shape to present here until after the last meeting.

Dr. Morrison writes: "In response to the request for my experience in the re-implantation of teeth, I will answer your questions in the order written.

"My personal experience in the operations of transplanting and

re-implanting teeth extends over a period of sixteen years. In that time I have performed re-implantation about three hundred times, and transplantation twice.

✓ All have proved successful with two or three exceptions, ~~where~~ there was great destruction of the process. It must be said, however, that the permanence of this success cannot be assured, as from slight accidental, or other disturbance, the teeth are likely to drop off without their roots at any time.

✓ I have tried many ways of performing the operation. My custom is to extract the tooth as carefully as I can, doing the least possible injury to the hard and soft parts. When the gum has been unusually adherent I have used the lancet with good results. This use has been only occasional, however, and I have observed no difference in those cases in the period of recovery, nor have I observed any increase or decrease of suffering consequent ~~upon~~ the use of the lancet; that depends ~~upon~~ the condition of the patient.

✓ Amputation of the root ~~or roots~~ is not generally performed. The apical extremities of the roots are not generally roughened, but where they are, or where they have an abrupt crook at the point, I trim them off and make them into good shape.

✓ In rare instances I find calcareous accretions ~~upon~~ the roots of extracted teeth, where no fistula or abscess having an opening into the mouth has ever existed.

✓ The conditions that call for re-implantation are just such conditions as ordinarily cause us to extract and throw away teeth. I 'hardly ever' have any cases of re-implantation in which any other operation or mode of treatment would answer the same end. The advantage hoped for in deciding ~~upon~~ re-implantation, in any case, would be a good tooth in place of a bad one.

✓ In cases of failure I do not know the cause; but such teeth are ever subject to the laws which govern deciduous teeth,—liable to be removed by absorption at any time. I have not perceived any peculiar diathesis as generally existing in those cases,—scrofulous, hemorrhagic, or tuberculous,—nor has nutrition been deficient or faulty.

✓ Some of my cases were for those occupying the highest social positions, others lower; but most of the cases were for women and girls in the Good Shepherd Convent,—maids-of-all-work. They were equally successful.

✓ The teeth that have been re-implanted rarely have a recurrence of abscess, but stand unnaturally firm in their sockets, unless, or ~~until~~ attacked by the odontoclasts. I have never had occasion to treat any a second time.

✓ When re-implantation has been practiced for tartar and exten-



sive loosening of the teeth, I have not observed that the gums become re-attached to those portions of the root that were denuded, and there is never a re-development of alveolus.

I invariably fill the pulp-chambers and canals before re-implanting. I do not regard the establishment of a fistula or other means of drainage as either necessary or desirable. I believe in doing the work thoroughly and neatly; nature will then do the remainder quite up to our standard of perfection.

I continue to replant, and will transplant when I can find suitable cases. Though sixty per cent. may be failures, I have had one, two, or half-a-dozen cases that I would not have missed for any reasonable consideration, and the patients are repaid for their pain and trouble twofold. Try it upon just such patients as will not give you time to treat abscessed teeth, or who live out of town and cannot come regularly. You get a tooth just ready for the filling, and the patient doesn't come back for a month. Everything is then out of order. We used to ~~extract such teeth and throw them away.~~ Just replant a few, and if everything goes favorably, you will have some successful enough to make you want to see more.

Dr. Bogue. I will venture to say that we have rarely had as much said in as few words, or as large results of experience given in so short a time. It is a commentary on the principles enunciated at our last meeting.

Dr. J. Ward Hall writes: "My attention was first called to the subject of re-implantation by a report of two successful cases, made by Dr. W. N. Morrison, in the *Missouri Dental Journal*, December, 1874, in which it was stated that his habit had been to perform this operation prior to that time, and as far back as 1862.

"After my association in practice with him, replantation became generally employed, and my failures have, so far, been about as one in ten in a little more than a hundred cases. For the last two years, however, I have been resting to wait developments.

"There has never been any ground for doubt concerning a new union of a tooth with the socket from which it had been extracted, if replaced under proper circumstances and with good judgment, but there has been a reasonable fear that the operation would not prove to be a permanently successful one.

"This fear was founded on the appearance, in some cases after the tooth had become firm and apparently healthy, of an organized cellular tissue which destroyed the tooth-bone itself as well as the alveoli. This is believed to be composed of odontoclasts, and, in my opinion, constitutes the only dangerous natural enemy of replantation. If the dentist can anticipate the appearance of these organisms and destroy them when they do molest a tooth, replanta-

tion, when skillfully employed, is a universal, first-class success. But it is an operation that should never be considered until all other means of saving the tooth in the best possible condition have been weighed and found wanting.

"The operation of replantation includes the perfect filling and secure retention of the tooth in position until firm in its socket."

Dr. George A. Mills. I am impressed now, as I was on hearing the paper of Dr. Thompson at the last meeting, by the fact that all of these advocates are making a good deal of a very simple matter. I do not doubt the honesty of these gentlemen, but I cannot indorse the practice with my understanding, nor do I receive from what these gentlemen have given us any valuable instruction, unless it may have proved the *unworthiness* of the practice. They say, those cases reported were not amenable to the general modes of treatment, but do not present the testimony. I notice the frequent readiness of men to assert that this and that case *cannot* be treated by the usual methods, and yet, these cases *are* being cared for successfully by the modes continuously being made known to us. My criticism is based on the principles of the general presentations of this mode of practice. To my mind it falls to the ground as being an unwarranted practice, *for one thing is sure*, the lesion is increased, and necessarily there must be a greater amount of secondary tissue, which is less endowed with the capability of resistance for *possible* future circumstances.

Dr. Bogue. I am glad to hear Dr. Mills making these comments. He may be replied to in a very few words: "All things are possible, but all things are not expedient."

Dr. Morrison has adverted to a class of cases—mostly servant-girls and maids-of-all-work—presumably people of small means; he has also specially pointed out people who live out of town, or who will not keep their engagements. None of us like to spend many hours of valuable time over the case of a servant-girl who cannot afford to pay our fee, although many of us, if we had such a class of patients, would sooner extract the teeth and re-implant than let the patient suffer, or give up beaten. It seems to me that that is about the ground as to expediency which Dr. Morrison presents. I have no doubt there are many gentlemen in the room who would never have occasion, or hardly ever, to extract and re-implant. I have performed the operation four times within eight years,—three times with success and once without. The last time was two or three years ago, and I saw the patient this evening. The root remains firm, but the crown is all decayed away; there is nothing left of it.

There is one other matter I want to bring up touching our October

meeting. A large proportion of the practice of medicine is empirical. I regretted, therefore, to hear the strictures our friend Dr. Atkinson indulged in at that meeting; I don't think he could consider them fair if he had read the paper. The experience of any one, if a careful record is kept and conditions noted, is of value, and I regretted to see experience so lightly thrown aside when it was given in all faith. I am not disposed to coincide with the views of the paper or its manner of presentation, but I hope when gentlemen take the trouble to present a paper before this society that they will be fairly received and kindly dealt with, and especially when the results of a great many cases have been carefully tabulated and are given to us with the understanding that they shall be made public. The reputation of the sender depends upon their truthfulness and accuracy, and it behooves us to weigh pretty well the words that the contributor sends to us and that we use towards him.

Dr. C. D. Cook. I show a cast of the teeth of a lady twenty-one years of age, a patient of a dentist in the West. It was sent to me asking advice as to what should be the treatment. The model represents the teeth pretty correctly, I presume. The deformity consists in the great protrusion of the upper incisors, and, to a less extent, the cuspids. In closing the mouth the lower incisors strike the gum of the upper jaw just back of the incisors. The left superior first bicuspid has been extracted. There are large spaces between the cuspids and lateral incisors, and less large between incisors. There are large fillings in the lower molars. I do not know if the "wisdom" teeth are in place, as the model does not show them. The gentleman asks if it is best to attempt to regulate them, or should the four or six front teeth be extracted? I shall be pleased to be able to convey to him the opinion of the members of this society.

Dr. S. G. Perry. For a case quite like the one shown by Dr. Cook I used a vulcanite band or plate, fitted over the front teeth, having two steel wires projecting at the corners of the mouth. To these wires were fastened elastics, and these in turn were fastened to silk bands, which were carried around the head, one above and one below the ears. The age of the patient was about fifteen. The four sixth-year molars being defective and in the way were extracted. I could not then get sufficient support for a plate over the roof of the mouth and around the twelfth-year molars without pulling them forward faster than I could pull the incisors and bicuspids back; but by getting firm support about the back of the head, very rapid progress was made in carrying back the incisors and the four bicuspids. It will be seen that my case was so nearly like this that my plate nearly fits the cast shown by Dr. Cook.



Dr. Francis. It would seem to me needless and unwise to extract any of those teeth. I have a case under treatment which was fully as bad or worse than this one, and it will result in a complete success. Allowing the molars to elongate and then pressing the front teeth back will accomplish the whole thing. I do not think it a very difficult task to accomplish, although it will require some little time to complete it.

Dr. O. E. Hill. This case of Dr. Cook's is an interesting one, and I should like to hear Dr. Kingsley's views upon it.

Dr. N. W. Kingsley. I am in constant receipt of models, by mail and otherwise, about which my advice is asked, and I almost as constantly say I can form no definite opinion from models alone. With reference to this case I would say I have treated cases almost exactly like it, and have secured the best results in restoring the dental arch to its proper form and improving the appearance of the face. In May, 1866, I reported a case which was worse than this, before the New York State Dental Society. That case was treated with a band over the front teeth, and with wires standing out of the mouth, and with a bandage over the head, almost identical with the one described here by Dr. Perry. The time taken to produce the change in that case was about three months. I think I began the last of January, and I made that report in the beginning of May. The model which I then took of the case showed a remarkable change. The dental arch had a perfect regularity, and the face had assumed the inherited type of the family.

If my advice were asked as to the prudence or wisdom of undertaking a case of this kind at this age, I should certainly hesitate very much. There might be some circumstances brought to my mind from a personal knowledge of the patient which would influence me to do it, but if I were asked if I would undertake the treatment of the case with my present knowledge, I should say no. The case before referred to was of a young lady, then about fourteen years of age. The teeth projected more than these, and I think must have produced even a greater deformity of the face. At the close of the treatment, in May, I found the family anxious to go to Europe for the summer. That intimation had not been made before that time. They were anxious to go, and had only been waiting for the completion of the treatment that they might go. Seeing the result, as they supposed, fully accomplished, they were so determined to go that I gave my consent reluctantly. I made appliances with great care to retain the teeth in their place, and took pains to instruct them in the use of them and permitted their departure with some timidity. They promised to be back by the first of September, as I had said that I would not consent to their

going if they were to remain longer than that. It was as unwise to permit them to go for three months as for twelve. I heard nothing from them until some time in September, and on inquiring of other members of the family I learned that they had concluded to remain for a year. I made anxious inquiries in relation to the condition of the young lady's teeth, and after some weeks learned that she was seasick on board ship for three or four days, had taken the fixtures off her mouth, and when she attempted to replace them found they would not go on easily. Not feeling well, she concluded to wait until she reached the other side. When she got there she could not get them on. After a few months the teeth resumed their original position. She then consulted some dentist in Paris, who attempted to bring them back again. In the course of treatment at his hands the pulps of the two central incisors were destroyed. After a period of nearly two years she came back to me with the teeth, if anything, in a worse position than when I first saw them. I was naturally disgusted with the whole performance and declined to do anything further. I learned, some time afterwards that she had had all her front teeth extracted, and was wearing artificial teeth. I have treated other similar cases, but have learned not to allow them to go away from me until I felt pretty well satisfied that the results were permanent.

Dr. Northrop. I would like to ask Dr. Kingsley if this patient be twenty-one years of age, how old she would be when the teeth would be permanently in place so that he could feel that the treatment was a permanent success?

Dr. Kingsley. If she is now twenty-one years of age, they have been in their present position say thirteen years, and it might take quite as long to have them become permanently fixed in a new position, thus making the attempt at correction unjustifiable.

Dr. Bogue. In the *Dental Obturator* for 1855, published at New Orleans, by Dr. John S. Clark, occurs an article on the use of cylinders for filling teeth with gold. This article contains the instruction which Dr. Clark was kind enough to give to five or six of us in Chicago not long after the paper appeared.

This instruction has been of great service to me, and doubtless to many others, but the teachings of later years have not generally been in that channel, and there may chance to be some present who have never heard them.

As the *Obturator* has been for many years out of print and exceedingly difficult to obtain, I shall run no risk of reading about a hackneyed subject, if I suffer myself to read directly from the printed page certain extracts from Dr. Clark's paper.

Another reason for bringing the subject up at the present time is that cylinders already prepared for use as cylinders, and not as pellets, can now be procured, a form of gold that it has hitherto been impossible to obtain.

We may not fully agree with all the claims made by Dr. Clark in favor of this form of gold, but I think the final claim, viz., that time has shown that fillings inserted in this manner have proved to be more accurately adapted, more uniformly dense on the surface, more accurate at the cervical margins in approximal cavities, and, on the whole, more durable, is amply substantiated by the observations of the past twenty-five years.

I will add another claim to those of Dr. Clark, which is, that fillings in plain cavities, and in some that are difficult, may be accurately made by this process in less time than by any other.

It will be borne in mind that the figure of cigars in a tumbler expresses the mode of operation. These cylinders being compressed, and smaller ones inserted in the interstices until no more can be got in, constitutes the method of filling with cylinders.

I will read the following extracts from Dr. John S. Clark's paper in the *Obturator*:

"Filling teeth is admitted to be one of the most important and principal operations of the dentist. A filling may be solid; it may be put in mechanically too well to come out soon; it may be smooth, and still in either case, be a *bad filling*.

"We propose, first, to examine the mechanical principle on which we rely in forming a solid and united mass of gold into a filling.

"Take a couple of leaden bullets and cut a perfectly flat plane on one side of each, place these together and an even, slightly rotating pressure will cause them to unite, so that the full strength of the same fingers that joined them will not be able to separate them. What causes them to cohere? The perfect exclusion of air from the planes, and the tendency in soft metals to cohere when clean surfaces are placed in contact. Pure gold being a soft metal is governed by the same laws.

"In examining the different modes of introducing foil we wish to be fully understood that, so far as concerns the one point of solidity, it is of no consequence how the foil is introduced, provided that in the end it attains perfect cohesion.

"Let us, then, examine in the light of the experiment quoted the means of bringing foil to fulfill the conditions necessary to cohesion.

"Take a sheet of foil, cut it, without soiling, into strips three-eighths of an inch wide and lay them carefully together. Now one condition is nearly fulfilled,—that of planes in contact.

"Force out the air between them by pressure, and the result will



be found to be cohesion. Take another sheet of foil of the same size, crush it together, unsoiled, and apply the same pressure, and you have a very different degree of cohesion. Carry the experiment further, roll them both into thin plates in the mill, and upon examination a great difference will be found to exist between them. This experiment will prove an interesting one, and will probably satisfy any one that the nearer we place the folds of gold in the cavity of a tooth in plane surfaces against each other the more nearly we approximate to a perfect cohesion of the metal. Before describing how this can be done with the least lateral pressure, even to the building up of artificial crowns or cusps, we will examine the principles involved in the different modes of manipulating gold in filling teeth.

"Dr. Watts, in an article on crystal gold, in the *American Journal of Dental Science* for January, 1855, says: 'The most successful operators with foil succeed best when they prepare their gold in the form of pellets, which are constructed by breaking up the smooth surfaces of the foil into as many angles as possible, and shaping it into balls, or pellets, of different sizes. These are introduced, one by one, into the cavity of the tooth, where they readily take hold upon those which have preceded them, and are gradually worked into their texture.'

"We apprehend that Dr. Watts is mistaken in two points. First, the most successful fillings are not put in in the manner described by him; and secondly, good fillings are not secured by welding, nor upon the principle of interlocking the fiber, as in making the woolen fabric called felt.

"The cohesion of soft metals does not take place upon either of these principles, and when really good fillings of foil are put in, they do not depend for retention or solidity upon welding, nor upon the "spider-leg" shape of the gold or the cavity. Their perfection depends upon the manner in which the planes are brought in contact, and upon the right application of force to drive out the air and condense the grain.

"We expect that there are many in the profession who are anxious to cull from all sources the means of accomplishing the important operation of putting in a good filling, according to the always utilitarian principles of science. We earnestly urge all such to try these experiments faithfully and minutely, and in so doing to observe closely every point laid down as the basis of experiment. Just here we would refer again to one point, and that is the cleansing of surfaces. One means of insuring it is to fold the gold without contact with the fingers, or with any unclean surfaces, and another is to anneal after forming, as that process is cleansing.


"In filling I use my gold entirely in the form of cylinders, which are set up parallel to the walls of the cavity, from bottom to top, until it is apparently full. A round-pointed instrument is then forced down between them, and other cylinders inserted in the opening, decreasing the size of instrument and cylinder until the cavity is literally full. These cylinders are made thus:

"I take a watchmaker's small pivot-broach and break it off about one-eighth of an inch from the shoulder. The broken end is then reduced to a perfect point, preserving the cutting-edges of the broach as perfectly as possible. I then fold the gold in strips as wide as I wish my cylinders long, according to depth of the cavity to be filled. To catch the end of a strip on this broach-point between the thumb and forefinger of the left hand, and to rotate the broach with the right, will obviously make it easy for any one to produce a perfectly even and smooth cylinder of any desired size.

"These cylinders are made of different densities. The first and those placed against the walls of the cavity are rolled lighter than those introduced last, which are rolled quite hard. Some are made of a slightly conical shape, by folding the strip thicker on one edge than on the other, and are introduced, according to shape of cavity, with the base of the cone in or out, as the case may require.

"If we have correctly stated the results under this application of the laws of cohesion to the introduction of gold foil into a carious tooth, we are safe in asserting that the union takes place at the lowest possible point of pressure,\* so that in applying pressure to a frail tooth whose walls are thin and easily fractured, we can secure a filling with less pressure, and consequently with more safety, than by the common method. But the question of safety is by no means the only one.

"It must be conceded that the mere accomplishment of an impervious filling in a frail tooth is of very little use, comparatively, for if we cannot make up in some good degree for the loss of strength caused by the removal of the dentine, the tooth will soon break down and our operation fail of much good. But here, if the premises are correct, we have the best protection that can be afforded to thin, frail walls; for if an absolutely solid filling is placed against the inner surface it must be better than one that will give on slight pressure.

"To test this, take a piece of seasoned hickory and drill a hole in the end the size of the white part of this figure, , and an eighth

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\* This coincides with the views held by Dr. T. D. Shumway, of Plymouth, Mass., who, as is well known, has advocated the use of ivory-points for filling teeth in connection with cohesive gold.—E. A. B.

or sixteenth of an inch deep. Cut it down on the outside till the sides are as thin as the rim of this figure, and fill the cavity thus formed with clean, soft cylinders as solidly as you can without splitting the wood. Harden the plug carefully with small-pointed instruments, and file it off even with the end of the wood. By passing the point of a knife through the wood, below the filling, splitting the piece, the filling can be taken out and examined, and if it has been well done it will be found to form a pretty solid and compact mass. To try it by comparison, fill another piece of hickory of exactly the same dimensions by the mode you usually adopt, or in any other way preferred, or with gold in any shape, and compare the two in regard to compactness or density. Weigh them, etc.

"We are now willing to hazard a few assertions, confident that any one who has faithfully and patiently experimented in this direction will find our assertions to accord with his experience. We have endeavored to prove that a tooth is greatly strengthened by a cylinder filling. The arch in mechanics is regarded as the best example of strength against external force. The cylinder filling, when we consider the laminae of gold, presents the shape of an arch, and any operator might be astonished at the amount of pressure that a mere shell of a tooth will bear from the condenser. It is undoubtedly the best protection that can be given to a frail tooth, at least as compared with any mode known to us. By this manner of filling, too, we can always be sure of a perfect orifice-adaptation, or, in other words, a perfect marginal edge to the filling. Its line will be as perfect as any joint in mechanics can be made. To us this seems a matter of great importance, because if the other steps in the operation have been perfectly attended to, viz., the excavation and condensation, the final success of the work is likely to depend upon this one point. This is where disease usually finds its way, even into teeth apparently well filled; and, we will further add, around and under the best fillings ever put in, if foreign deposit is allowed around the margin. We none of us absolutely save teeth; we only remove the disease and shield the exposed cavities by so perfect an adaptation of gold to them, and by making the surface of the fillings so perfect with the surface of the teeth, that *they can easily be kept clean*. It adds nothing to the negative of this assertion that many rough fillings have stood the test of years. They are retained in spite of the imperfection, just as many persons retain their entire denture to old age who never used a brush in their lives. These are the exceptions; the common facts are all the other way. The rule seems to be that unless a filled tooth can be kept clean around the filling it will, sooner or later, fail from deposit and decomposition around its margin. We feel no



hesitation in saying that the operator who, after using the file, fails to remove its marks from the work, or who fails to leave the surface of a filling even with that of the tooth, must, sooner or later, fail in his attempts to arrest disease in teeth.

"Another advantage of cylinder-filling is that a cavity with but two opposing walls, and these almost at right angles, may be filled with them, using cone-shaped cylinders, by springing an arch from one wall to the other,—a bicuspid, for instance, with the inner cusp gone to the gum.

"In filling a small but deep cavity, or in completing a large filling on an approximal surface, it is not always an easy matter to pack the foil thoroughly in the deep and narrow foramen, for in the form of roll, strip, or pellet, it must necessarily be packed from the bottom up, and that with very small instruments. But with cylinders the gold becomes the instrument, so to speak, and a cylinder larger than the instrument necessary for packing can be forced down to the very bottom of the cavity. For instance, a filling is to be inserted between the incisor teeth, one line deep and a half line in circumference, while the separation between the teeth is less than half a line. To pack gold into such a cavity, a very small instrument would be required, with which very little force could be used, and then it is doubtful whether the packing to the bottom of the cavity could always be perfectly done. Try cylinders in such a case, and the first may be put in large enough to half fill the cavity, and sent to the bottom as perfectly as desired. Two or three more will complete the operation, and the last be driven home as perfectly as the first. In filling deep cavities, however, the last cylinder but one should be only half as long as the depth of the cavity. It should be forced down and headed, as it were, against the bottom of the cavity, and so be made to spread over the inner surface. The last one being forced down to that, any imperfection that may exist in the union of the gold will probably be in the center of the filling.

"Again, suppose a cavity in the posterior surface of the last upper molar so situated that all operations must be performed by the use of a reflector, it will only be necessary to enter the point of the cylinders by the aid of the glass, when they will be easily forced home. A cylinder, apparently as large as the cavity, may be used in such a case; an instrument forced down by its side prepares the way for another, and so on until it is full. Even in cases as difficult as the one suggested, the filling may be as perfect in adaptation, solidity, and finish as if in any other position, and if any fillings need to be made perfect, they are those that cannot be seen and examined with facility. The more concealed the more is perfection required.

"It is well known that in filling cavities between the bicuspid or molar teeth the point to be protected is the lower or cervical margin near the gum.

"It is easy enough to mash up (excuse the term) a mass of gold so as to make a filling that will be hard and impervious and look yellow after burnishing, but does not the cervical margin often show signs of imperfection, even in the fillings of good operators? We do not say this to gain a point, but to *point a fact*. Will not even the best operators be glad to know that the first third of their filling lies in compact, smooth laminae against the cervical wall? This may be accomplished in most cases by a single cylinder long enough to protrude from the mouth of the cavity to the adjoining tooth, and then forced up against the cervical wall."

Dr. Bogue. I should feel more like apologizing, Mr. President, for reading the extracts that I have in my hand, did I not know that yourself, in common with some of the other gentlemen present, have been for many years in the habit of using cylinders and making them for use yourselves; and that those who have used them have been so deeply impressed with their value that it is perhaps not out of place to bring the subject up once more, even in the New York Odontological Society.

Dr. Brockway. Have you been using cohesive gold all this time?

Dr. Bogue. The discrimination between cohesive and non-cohesive gold I do not apprehend was held in those days as we hold it now. I do not need to say how Dr. Westcott claimed to have discovered the cohesiveness of gold by having the gold sent in a letter without a book. The gold all stuck together. The gold of that quality of cohesiveness was used by Dr. Clark. Just here a little bit of personal experience. When Dr. Atkinson introduced heavy gold to our use, like all the rest of us, I experimented some. I took a steel plate one day, making up my mind to put in as good a plug as I knew how. I put that filling in in one hour and ten minutes. A few weeks later, while talking with Dr. Moffatt, I asked if he ever used cylinders. He said no. I then showed him this experimental filling that took me an hour and ten minutes to insert with cohesive gold, and said, "The same steel plate lies here; I will see what I can do with cylinders." The cylinders were ready made. Just as I made that statement the lunch-bell rang. I filled that cavity in twelve minutes, filed it off, and burnished it,—the same identical hole in the steel plate that it took me an hour and ten minutes to fill with heavy gold. The plug was driven out with a mallet afterwards. I think I have it yet, and it is coherent, and the gold was supposed to be non-cohesive gold.

Dr. Brockway. How did it compare with the other filling?

Dr. Bogue. It was far more perfect and better adapted to the walls than the first was, but it was soft. Our friend, Dr. Latimer, poked it with his lead-pencil and made a dent, and I suggested that if it was in a tooth it would not be poked with a lead-pencil, and would not be liable to be destroyed in that way. Every little imperfection—marks of the instrument with which the hole in the steel was drilled—was seen in the softer filling.

Dr. Dwinelle. I find I must re-assert myself with reference to this claim of Dr. Westcott to the discovery of adhesive gold. I will not undertake to do it to-night, but I will put in my protest against such claim. I will undertake at any future time, as I have already done, to demonstrate the fact that before 1852 there was no knowledge or system by which gold-beaters were able to produce at will adhesive gold.

Dr. Watt and myself were the first, from Solomon down, to discover and demonstrate the great fact in metallurgy that absolute gold is adhesive in itself and capable of welding cold. This is an inherent, a peculiar and a distinguishing character of gold never before known. Starting with absolute gold, representing the greatest degree of cohesiveness, we are enabled to produce every quality and gradation of adhesiveness down to soft foil.

By over-refining gold so that it nearly approximated purity it became "sticky" (adhesive), as it was termed, which was always regarded as a misfortune, as it thereby became unmarketable. To make such gold available and useful, the gold-beaters were obliged to remelt it and alloy it down to the non-sticky quality of soft foil. After this quality was recognized and adhesive foil was reduced to a system, Dr. Westcott remembered that he once used some sticky foil, but he never pushed on his effort to discovery or demonstration, and not till the fact was published years afterwards did he know why gold was ever adhesive. Although pure gold is recognized as non-oxidizable, yet when exposed for some time to the atmosphere its surface undergoes a change which reduces its adhesiveness. As you know, this is immediately restored by heating it again.

Adjourned.

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#### THE AMERICAN DENTAL SOCIETY OF EUROPE.

THE eighth annual meeting of the American Dental Society of Europe was held at the Schweizerhof, in Lucerne, August 30 to September 1, 1880, President Dr. N. W. Williams in the chair.

The first session was occupied in the hearing of reports, voting-in



of new members, and election of officers for the ensuing year. The latter resulted as follows:

*President.*—J. W. Crane, Paris.

*Vice-President.*—A. B. Doremus, Zürich.

*Corresponding and Recording Secretary.*—W. D. Miller, Berlin.

*Treasurer.*—C. M. Wright, Bâle.

At the opening of the afternoon session the society entered upon the discussion of the question, "Is it correct practice to anticipate caries of the teeth by operations for permanent separation?"

The remarks, which took a negative view of the question and were necessarily in great part a reiteration of the generally-accepted views, may be summed up as follows:

1. The deforming of the teeth.
2. The removing of the enamel.
3. The rotation of the teeth liable to follow, and the disastrous results from the approximation of two flat surfaces of dentine.
4. The diminution of the surface of mastication.
5. The fact that permanent separations are found not to be by any means a sure preventive of decay.
6. The general repugnance to defacing a beautiful, sound organ simply because it *may* in the future be necessary to give it a filling.

The society agreed that there are cases where separation is both advisable and beneficial, but that those cases do not present themselves in sound, healthy, unattacked organs.

The discussion of the next subject, "The treatment of deciduous teeth and the best material for filling the same," then followed. A general need was felt for some material for filling children's teeth better than any we possess at present; some material which may be quickly and easily introduced, with the least possible pain to the child (so that it may not look upon a dentist as the black man who punishes bad little boys and girls), which will not be rendered useless by moisture, and which will preserve the tooth from three to five years. The ordinary cements are too soluble to suit the purpose; gutta-percha, where not exposed to the force of mastication, being preferred except for the necessity of having the cavity perfectly dry during the operation. The German pyrophosphates had been found to be preferable to all other cements, holding splendidly, especially on the grinding surface, and being non-irritant to the pulp.

Dr. Jenkins and some others are in the frequent habit of using tin and gold combined for filling children's teeth. It may be inserted in general as quickly, and sometimes more quickly than any other filling material. Dryness is not always an absolutely necessary condition, and as for durability, nothing better can be desired.

Dr. Jenkins recommends those who do not understand the manipulation of tin and gold to familiarize themselves with it for that purpose, as well as for use in permanent teeth. He learned the use of tin and gold from Dr. Abbot, about fourteen years ago, and has ever since made a constantly-increasing use of it in his practice. He claims the following advantages for the combination over gold alone in certain operations:

1st. In cavities in abnormally-soft or imperfectly-developed teeth,—such as present themselves in extraordinary numbers in a German practice,—the great pliability of the material permits its being adapted to the walls of the cavity, a thoroughly water-tight joint being secured with the minimum pressure.

2d. Its comparative insusceptibility to thermal changes causes it to be well tolerated in very large cavities, or in those where the filling approaches near to the pulp.

3d. After a time a curious molecular change occurs, probably due to the oxidation of the tin, by means of which the filling actually increases slightly in bulk, pressing against the walls of the cavity yet more closely, and presenting a surface as hard as amalgam. The filling thus becomes a homogeneous, crystalline mass, which can no more be separated into its original particles than a filling of cohesive gold. This change is not accompanied by discoloration, except upon the surface, and then only in fillings so situated that they cannot be reached with the tooth-brush.

4th. In those rare cases where a submarine operation is unavoidable, this filling is particularly to be recommended on account of the qualities just mentioned.

5th. In the hands of men familiar with the use of non-cohesive gold packed by lateral pressure, it can be far more rapidly worked than gold alone, and it is therefore valuable in cases where every moment of time saved is a special advantage to either patient or operator. It can also be easily adapted to the critical point of the filling, as, for instance, the cervical wall, or under the edge of the gum, when a slipping ligature or an unreliable clamp calls for aid from a projecting point of filling to keep the dam in place. The remainder of the operation can then be more leisurely completed by the use of gold alone, if preferred.

The only objections to its use were found in a roughening of the polished surface, caused by the swelling accompanying the molecular change, and in its color. When packed dry and with the gold surface next to the walls of the cavity, discoloration could occur only on the surface of the filling; but in its best estate its color was more objectionable than that of gold. Packed wet, the entire mass would discolor throughout. In the same hands the same results

would be invariably obtained, whether the tin or the gold were placed in contact with the walls of the cavity.

The speaker declared that, although tin and gold had been used by the first men in the profession in Germany, in some instances for a period of perhaps twenty years, and had been worked in every variety of proportion between the two metals with most gratifying results, no one had attributed success in its employment to electrical affinity, but that the united testimony of practical experience was that its sole value as a filling material consisted in the qualities above enumerated.

The society adjourned to meet at ten o'clock the following day.

#### SECOND DAY.—*Morning Session.*

The following paper was read by Dr. W. D. Miller:

##### THE CHEMICAL VERSUS THE ELECTRICAL THEORY OF CARIES.

Much has recently been said and written with regard to the action of electricity in the oral cavity. It is, however, misleading in the extreme to speak of the electrical theory of caries; in fact, it should not be spoken of as a "theory of caries" at all, since it only attempts to account for that decay which takes place in cavities already filled, especially when the fillings are metallic, while the more extensive ravages of decay in mouths which have never come under the charge of the dentist, and which, consequently, cannot be due to galvanic batteries of his construction, are left entirely unaccounted for. Consequently, when I use the expression "electrical theory of caries," I refer to that decay only which takes place around the margins of cavities already filled. I use the term "tooth-bone," or "tooth-substance," to indicate all that remains of the tooth after every trace of moisture has been removed.

It is necessary to grasp two fundamental facts in order to understand the arguments upon which the electrical theory is based.

1st. When two heterogeneous metals (in general two chemically dissimilar conductors) touch one another, a difference of potential is produced between the two conductors, charging one of them (the electro-positive) with positive electricity and the other (the electro-negative) with negative electricity in exactly equal amounts, and in this state the former (the electro-positive) has an increased affinity for electro-negative or acid bodies. The charge of electricity so developed, as well as the increased chemical activity resulting from it, is, however, very small.

2d. In any cell of a galvanic battery, acid is set free at the positive pole and alkali at the negative, and as long as the current continues



to flow, the positive pole (when not a noble metal) continues to be acted upon by the acid so liberated.

Therefore, if we were to take a piece of zinc or a zinc model of a tooth and make a gold filling in it, or attach a piece of gold to it, the zinc would be more rapidly attacked when immersed in any electrolyte than when no other metal was in contact with it, and for two reasons:

1st. Because the whole surface of the zinc would become electro-positive by contact with gold, and would therefore more actively decompose the solution and take the acid constituents to itself. This action is inconsiderable as compared with the following.

2d. Because the electric current generated between the two metals would liberate acid over the whole surface of the zinc, by which the action upon the zinc would be still much more increased. We see, then, if teeth were made of zinc what disastrous results would follow their filling with gold.

But can we, without any further question, assume that the same action takes place even to a limited extent, or to any extent whatever, when a natural tooth is filled with gold or any other metal?

In other words, do any two substances when brought into contact assume a difference of potential, or can any two substances act as the generating plates of an electric element? An article in the *Correspondenz-Blätt für Zahnärzte*, translated from the *Practitioner*, contains the statement that "a galvanic battery may be constructed with almost any two different substances whatever." "It is only necessary that one of them be more readily acted upon chemically than the other."

A stick of wood and a piece of mica are two substances which fulfill the above condition, but we would try in vain to form an electric element by use of them; we would equally fail with sealing-wax and glass, or with gold and glass, even though both substances might be entirely consumed in the attempt. But what condition necessary to the production of an electric current is wanting in the above cases?

*Conductivity.*—When two chemically dissimilar substances are made to touch one another, they do not assume a difference of potential or become charged with electricity if one (or both) of them is a non-conductor, and no electric current can be produced by the use of any two chemically dissimilar substances if one (or both) of them is a non-conductor. Tooth-bone is a non-conductor and consequently cannot become electro-positive, or be changed in potential by contact with gold, and cannot act as the pole of a cell when immersed in an acid or salt solution.

I say that tooth-bone is a non-conductor, though the fluids with which the tooth is permeated are conductors.

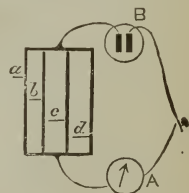
It is necessary that the difference be thoroughly understood.

A silk thread, for instance, is a perfect non-conductor, but by dipping a silk thread in a salt solution, or in any liquid which conducts, we obtain a conductor. Now it is not the particles of the thread which transmit the current, but the particles of the liquid; and if we were to bring a piece of metal in contact with this moistened thread the potential of the particles of silk would not be changed.

This is what we have in the living human tooth,—a non-conductor permeated by a conductor. If we were able to construct a tooth of glass and fill the pulp-cavity, the canals, and tubules of that tooth with a solution of common salt of strength  $\frac{7.5}{100}$  per cent. (which has about the same specific resistance as the tissues of the body), then we would have an electrical instrument similar to a living human tooth. Such an instrument would transmit a current of electricity; in other words, it would be a conductor just as the wet silk thread is, but the substance of the tooth—the glass—could not receive any potential, even by contact with gold or any other metal. I speak of the potential of voltaic electricity. This is the kind of an instrument we have in the human tooth: the substance of the tooth, tooth-bone, a non-conductor permeated with a conducting substance, the fluids of the tooth. It can transmit a current of electricity in the same manner that the wet silk thread and the glass tooth in the above examples do, but the tooth-bone itself is no more affected, and can no more be changed in potential than the silk or the glass. Remove the fluids—*i. e.*, dry the tooth—and it becomes as perfect an insulator as silk or glass. That tooth-bone is a non-conductor is evident from its composition; not only that, but a cross-section of a tooth  $\frac{4}{100}$  mm. in thickness completely shuts off the current from a battery of three Daniell's elements,—a current of infinite strength compared with that which would be obtained from a "tooth-battery," even if the tooth-bone were a moderately good conductor.

By inserting a number of such sections in the circuit, as at *a*, *b*, *c*, *d* in the figure, I have determined the resistance of a section whose thickness is only  $\frac{1}{100}$  mm., and I have found that even so thin a section offers an infinite resistance to the passage of the current.\*

That the apparent conductivity of a living tooth is simply due to the conductivity of the fluids within the tooth, is further demonstrated by the following facts: 1st. If we determine by experiment the resistance of a very thin section of dentine moistened with different liquids,



\* A reflecting galvanometer, after Dubois-Reymond, having 16,000 turns of wire, and a resistance of 5,000 ohms was made use of.

we will find that the resistance depends upon the direction of the dentinal tubules, being least when the section cuts them at right angles,—*i. e.*, when the tubules or liquid columns within them are shortest,—and greatest when it is made parallel with them, or when they are the longest. 2d. The resistance of the section increases and diminishes with the resistance of the liquid with which it is moistened. 3d. A section of enamel offers more resistance than a section of dentine equally thick, being more compact and consequently taking up less moisture.

It is always possible to produce an electric current by means of two liquids and one metal, provided that both liquids are conductors, communicate freely with each other, and act differently upon the metal. If these conditions were fulfilled a current might result from a metallic filling and the fluids within and without the tooth; but in such case tin and amalgam would produce very much stronger currents than gold. The writer of the article above referred to says that "living dentine is a better conductor than dead." A metallic filling in a living tooth would, if such were the case, produce a stronger current than the same filling in a dead or a pulpless tooth. Thus we are led to the conclusion that a filling would fail sooner in a live tooth than in a dead or a pulpless one. A conclusion which is, I believe, not quite in accordance with the experience of the profession. The only escape from the dilemma is found in the fact that neither living nor dead dentine can act as a generator of electricity. In the first place, then, a current between tooth-bone and filling material is theoretically impossible, the former being a non-conductor.

Secondly, "No one has ever yet been able to detect such a current, much less measure it.

Thirdly, "living dentine" being "a better conductor of electricity than dead," and electricity being the chief, or a very prominent factor in producing the failure of operations on the teeth, it follows that the number of failures would be directly proportional to the vitality of the tooth, and the only scientific way to treat a tooth would be, on the first appearance of decay to devitalize the pulp and fill the cavity with oxychloride of zinc or amalgam.

If we were to accept the assertion that for an electric element to be composed of any two substances "it is only necessary that one of them be more easily acted upon chemically than the other," we should be led to conclusions quite as curious. For, enamel and dentine are two such substances, so, too, enamel and cementum, also dentine and cementum.

Therefore, in nearly every tooth there would be an element composed of enamel, cementum, and saliva, and a very slight decay at the neck of the tooth, exposing the dentine, would give us two other



elements, one having dentine and cementum, and the other dentine and enamel as generating plates; so that a man with a full denture might have any number of "galvanic batteries" between 0 and 96 in his mouth without ever going to a dentist.

If tooth-bone itself were capable of acting as the generating plate of an electric cell, as it is claimed to be, then a tooth with or without a filling, having the slightest exposure of dentine or cementum in a saliva capable of acting upon tooth-substance, would be like a piece of impure zinc in very dilute sulphuric acid, to be slowly eaten up by local currents,—a result which would undeniably follow if there were any truth in the electric theory.

For, if enamel is capable of producing an electric current when in contact with gold in saliva, or, in other words, if enamel is capable of acting as the first generating plate of an electric element, then is dentine also, and *vice versa*; and if dentine is, then is cementum also, and *vice versa*, so that we have enamel, dentine, and cementum, each capable of acting as a generating plate in an electric cell.

But they cannot so act to the same degree, because they are chemically different and are differently acted upon by acids; but any two bodies which are generators, differing in degree, may constitute the poles of an electric element.

Hence, if gold and enamel, or gold and dentine, in the fluids of the mouth form an electric element, so may enamel and dentine, enamel and cementum, dentine and cementum.

And if there were any possibility of an electric current between metal and dentine, there would also be currents between the different tissues of the tooth, and the tooth would suffer from the action of local currents without the presence of any metal at all.

Writers on "tooth-batteries" are accustomed to confine their observations to metal and dentine, but we must bear in mind that in secondary decay—*i. e.*, around fillings—the enamel must be and is attacked as well as the dentine, and that there is no reason in the world for supposing dentine to be a generator of electricity and enamel not.

Again, experiments made out of the mouth, under conditions similar to those existing in the mouth, do not give results which indicate the action of electricity.

Suppose we could find two teeth, or two pieces of dentine, exactly alike in every respect, and make in one of them a filling of gold and in the other a filling of zinc-oxychloride of the same size, and allow both teeth so treated to remain in a dilute acid for a certain time; then, if the tooth containing the gold filling were found to have lost more in weight than the other, we would or should infer, at first, that we had made some error in the course of the experiment;

and not until we had repeated it five, ten, or twenty times, each time with the same result, and had satisfied ourselves that we had eliminated all sources of error, might we affirm the presence of galvanic action. One experiment of this nature and having this result has lately been presented to the profession, and by that one we are expected to be converted. On the contrary, the only impression which one receives from the result is its utter impossibility. In the above experiment six similar pieces of dentine were similarly filled with gold, amalgam, tin, gutta-percha, wax, and zinc oxychloride; left for a week in a dilute mixture of vinegar and water, the pieces lost as follows:

Piece filled with gold	6 cg.
" " " amalgam	4 cg.
" " " tin	3 cg.
" " " gutta-percha	1 cg.
" " " wax	1 cg.
" " " zinc-oxychloride	0 cg.

I have made in all over twenty experiments of like nature with different substances, and under varying conditions. The results of ten of these experiments are given below, and each one may draw his own conclusions from them. These ten were not selected from the whole number, but each alternate one was taken in the order in which they were made. The first series of experiments I made with ivory, the second with dentine taken from a fish tooth, the third with dentine from human teeth. The pieces of human dentine were made in pairs, both members of each pair being obtained from the same tooth by making a cross-section of a sound large molar, removing all traces of the pulp-cavity and of the enamel, and then dividing the section symmetrically into halves. In this way the two pieces of each pair were as nearly alike as they could well be made.

In some of the experiments the pieces were filled with different materials, in others they were suspended to equal depth in the solution by means of wires of different metals and of silk thread, the latter method being equivalent to making fillings of the same materials, the silk thread corresponding to a filling of wax; the wires were all of same diameter. In the sixth column of figures, headed "comparison," I have given the results which would have obtained in accordance with the experiment above referred to, on the theory that if gold causes a certain loss in weight, amalgam will cause two-thirds the same, tin one-half, gutta-percha one-sixth, wax one-sixth, while the piece filled with zinc-oxychloride suffers no loss in weight. The balance used was capable of noting a variation of two-tenths of a milligram.

## EXPERIMENT I.

SUBSTANCE.	WEIGHT IN MGS.	SOLUTION.	TIME.	SUSPENDED BY	LOSS IN WEIGHT.	COMPARISON.
1. Ivory	115.6	Sulphuric acid, 1 per cent.	Six weeks	Gold wire	30.6	30.6
2. "	"	Sulphuric acid, 1 per cent.	"	Silk thread	31.1	5.1
III.						
1. Ivory	204.0	Vinegar	Two weeks	Gold wire	76.0	76.0
2. "	"	"	"	Platinum wire	76.4	
3. "	"	"	"	Copper "	76.5	
4. "	"	"	"	Tin "	75.0	38.0
5. "	"	"	"	Silk thread	76.8	12.7
V.						
1. Dentine from fish tooth	912.0	Lemon-juice	Eight days	Gold wire	248.0	248.0
2. Dentine from fish tooth	"	"	"	Silk thread	244.0	41.3
VII.						
1. Dentine from human tooth	39.3	Acetic acid, 20 per cent.	Ten days	Gold wire	5.0	5.0
2. Dentine from human tooth	"	Acetic acid, 20 per cent.	"	Silk thread	4.6	0.8
IX.						
1. Ivory	201.5	Hydrochloric acid, $\frac{1}{2}$ per cent.	One week	Gold wire	53.3	53.3
2. "	"	Hydrochloric acid, $\frac{1}{2}$ per cent.	"	Silk thread	54.0	8.9

## XI.

SUBSTANCE.	WEIGHT IN MGS.	SOLUTION.	TIME.	FILLING MATERIAL.	LOSS IN WEIGHT.	COMPARISON.
1. Ivory	201.5	Sulphuric acid, 2 per cent.	One week	Gold	7.5	7.5
2. "	"	Sulphuric acid, 2 per cent.	"	Amalgam	7.3	5.0
3. "	"	Sulphuric acid, 2 per cent.	"	Tin	6.3	3.7
4. "	"	Sulphuric acid, 2 per cent.	"	Zinc-oxychloride	6.5	0.0
XIII.						
1. Ivory	195.5	Lemon-juice	One week	Gold	68.0	68.0
2. "	"	"	"	Amalgam	68.5	45.3
3. "	"	"	"	Tin	69.0	34.0
4. "	"	"	"	Zinc-oxychloride	70.4	0.0
XV.						
1. Dentine from human tooth	88.4	Acetic acid, 20 per ct.	Two weeks	Gold	13.5	13.5
2. Dentine from human tooth	"	Acetic acid, 20 per ct.	"	Zinc-oxychloride	14.9	0.0
XVII.						
1. Dentine from human tooth	70.9	Lemon-juice	Six days	Gold	49.6	49.6
2. Dentine from human tooth	"	"	"	Zinc-oxychloride	48.6	0.0
XIX.						
1. Two sound Bicuspid	885.0	Acetic acid, dilute	Three w'ks	Gold	79.0	79.0
2. Two sound Bicuspid	875.0	Acetic acid, dilute	"	Zinc-oxychloride	82.0	0.0



It would be a very difficult matter to detect the evidence of any electric action in these results.

Wherever there is a defect in the enamel,—a fissure or depression,—or wherever, from any other circumstance, the same conditions exist for the retention of food or saliva and the formation of acid, there decay will take place.

Now, whenever we insert a gold filling, unless we finish the gold perfectly smooth and even with the margin of the cavity, and unless the filling is perfectly water-tight, small particles of food will be retained by the jagged edges of the gold, and saliva will find its way into the fissure between the gold and the walls of the cavity,—two conditions for the production of acid,—and decay will sooner or later follow.

But the causes which produce the failure of fillings are too well understood and have been too often discussed to be repeated here.

To recapitulate—

1st. The electric current between gold and tooth-bone has never yet had any existence except in the imagination.

2d. Tooth-bone being a non-conductor, the electric current never can have any existence other than imaginary.

3d. Live teeth would produce stronger currents than dead or pulpless ones, and consequently operations upon them would be less durable.

4th. The possibility of an electric current between gold and enamel, or gold and dentine, implies the possibility of a current between enamel and dentine, enamel and cementum, and between dentine and cementum, and the consequent injury to the tooth from local action.

5th. The experiments recorded above conclusively show that if there was any electric action at all, it was too small to produce any visible result.

The discussion which followed the reading of the paper showed that the American dentists of Europe neither hoped nor feared anything from *tooth-batteries*, and went on filling and *saving* teeth as before, having no inclination whatever to return to a mode of practice which the most advanced of the native European dentists are just beginning to emerge from, seeing what has been and can be done by Americans on the gold basis, compared with what they have done on an amalgam basis.

#### *Afternoon Session.*

Dr. Elliott called the attention of the society to a diagram upon the blackboard, where were tabulated the results of a tournament held between some five dentists of England.

Originally the object of the contest was merely to demonstrate

who could put in a large contour filling in the least time; but so that the results might be more valuable to the profession at large, other features besides that of time were inquired into. Five human molars were prepared by an outside party, and, to present a natural arrangement, another molar was placed in front of the one to be operated upon. The cavity consisted of nearly the entire upper part of the tooth, but with three of the walls standing, the missing one being next the other tooth. The cavity would be thus described as a compound anterior approximal and crown. Both teeth were inserted to the neck in plaster contained in a small box. The five teeth were given by lot to the five operators, who filled them in their own way, merely keeping an account of the time taken. To designate the operators, letters were taken,—M, O, L, A, R, S. To prevent misconception, it might be as well to mention that A and S are one and the same operator. M, L, and R used the electro-magnetic mallet, O malleted for himself, A and S had the malleting done by an assistant, and to some extent used the Buckingham and pneumatic. After the operations were completed they were given through another party to an expert, who tested the work for weight and specific gravity by a very delicate scale; for superficial hardness by means of a square-pointed plugger, worked by the electro-magnetic mallet, which, by giving a uniform blow, answered the purpose very fully. The surface had been previously tested by a very powerful glass for smoothness and polish, also for cervical edge, etc. In order to estimate the fixity or firmness with which the gold was attached to the tooth, they were placed in a vise, protected by leather, and force applied on each side of the line of junction. The result was as follows:

	M.	O.	L.	A.	R.	S.
Time	4h. 49m.	2h. 30m.	5h. 10m.	2h. 30m.	3h. 46m.	2h. 50m.
Weight	33.6 grs.	53.1 grs.	48.7 grs.	59.9 grs.	54.6 grs.	49.4 grs.
Specific gravity	18.69	16.23	16.13	16.34	16.34	17.8
Order of fixity	3	2	4	1	5	6

In the order of fixity the numbers are in the order of merit, A being the poorest and S the best.

Combining two features considered most important,—*i. e.*, specific gravity and fixity,—the relative order was

	1	2	3	4	5	6
Specific gravity and fixity . . . . .	S	M	R	L	O	A
Hardness and smoothness . . . . .	S	M	R	L	O	A
Approximal surface and margins . . . . .	S	R	M	L	O	A
Polish . . . . .	S	R	M	L	O	A

Some curious facts may be drawn from this table, a prominent one being that time does not seem to be a necessary factor in doing good work. For while the poorest result was shown by A, who took two and a half hours, the best was by S, who only required twenty minutes longer. L, who took the longest time—five hours and ten minutes,—came out fourth in the order of merit.

The most rapid operators, O and A, were those who did not use the electric mallet, nor did S, as above mentioned. The others all used it. Even R, whose time is three hours and forty-six minutes, took over three hours to introduce the gold and only forty-six minutes to finish and polish. The practical application of this question of time is a most important one. For if each operator is remunerated to the same extent,—and all the operators were unmistakably good ones,—then O and A must receive double the pay that falls to the lot of L, or the patient must pay twice as much to one dentist for the same work as to another.

Dr. Elliott also presented a concise history of all the different methods of any value which have at different times been employed to any considerable extent in pivoting teeth. The description of each method was accompanied by drawings, showing the parts separately and in position. The great value of such a work consists in its presenting to us all the methods in such a compact manner that we may select the particular one which is best adapted to each individual case.

Drs. Jenkins, Daboll, and Kingsley described several cases in practice, illustrating what can be accomplished with remnants of roots which at first sight appear utterly worthless.

Dr. Charles Kingsley reported the following very interesting operation performed in his office in Paris by his brother, Dr. Norman W. Kingsley, of New York:

A gentleman applied for relief who had split off the buccal face of the first right superior molar, involving about one-third of the grinding surface and tapering off under the gum. The pulp-cavity was not exposed. There was a cavity of decay on the posterior approximal surface, of which the split-off slab formed one of the walls. The piece was replaced and bolted on as follows:

A hole—about No. 11 wire gauge—was drilled through the piece; it was then tied on to the tooth with floss silk and the hole drilled in the same line clear through the crown, being placed near enough the grinding surface to escape the pulp. A thread was cut through this hole with a screw-tap. The bolt to secure it was made by using the proper-sized gold wire and cutting a thread upon it. The other end of the bolt was flattened to be grasped readily with pliers. A washer of pure gold was slipped on to the bolt and soldered, leaving



the flattened end sticking out one way and the screw-thread the other.

After cleaning the tooth surfaces which were to come in contact, a thin solution of white gutta-percha in chloroform was placed upon them and the bolt rapidly screwed to its place. The edges of the pure gold head were then burnished down, the flattened end ground off flush, as well as the end which passed the palatal surface. The cavity of decay was filled with one of the oxyphosphate cements.

The retiring president, Dr. Williams, read an address to the society, containing a short history of the progress of the science of dentistry in the last ten years, and particularly of dentistry in Europe, which owed so much to the members of the society. Seven years ago four brave men struggled up the rugged heights of the Rigi, and there, above the clouds, founded the society whose motto was and is Progress.

Since that time the society had done much to elevate the standard of the profession in Europe as well as the attainments of the individual members. Every one who loves his profession and honestly endeavors to bring it a little nearer to the ever-receding goal, must be stimulated to still greater effort by association with others who are striving in the same direction. In America, the spirit of investigation and research, together with the laws prohibiting the practice of dentistry without the proper qualifications, are fast bringing the science of dentistry to a point where every one may be proud to be called a dentist.

Adjourned to meet the following August at Wiesbaden.

#### AMERICAN ACADEMY OF DENTAL SCIENCE.

THE annual meeting of the American Academy of Dental Science was held October 27, 1880, in the lecture-room of the Boston Society of Natural History, at half-past 10 A.M., President J. L. Williams in the chair. The annual address was delivered by Dr. Joshua Tucker, of Boston. Dr. Brackett, of Newport, followed with a paper on "The One Thing Needful to preserve Fillings." Discussion followed on the subjects of the address and essay by members of the Academy. The following officers were elected for the ensuing year:

*President.*—J. L. Williams.

*Vice-President.*—T. H. Chandler.

*Recording Secretary.*—J. T. Codman.

*Corresponding Secretary.*—C. P. Wilson.

*Treasurer.*—L. D. Shepard.

*Librarian.*—H. F. Bishop.

*Censors.*—E. G. Tucker, G. T. Moffatt, F. N. Seabury.

C. P. WILSON, *Corresponding Secretary.*

## MASSACHUSETTS DENTAL SOCIETY.

The sixteenth annual meeting of the Massachusetts Dental Society was held in Codman & Shurtleff Hall, Boston, December 9 and 10, 1880, the President, Dr. C. G. Davis, of New Bedford, in the chair.

Voted, that Herbert E. Dennett be and is hereby expelled from membership in this society.

The following were elected officers for the ensuing year:

*President*.—Dr. G. F. Waters, Boston.

*First Vice-President*.—Dr. C. H. Osgood, Boston.

*Second Vice-President*.—Dr. H. F. Bishop, Worcester.

*Recording and Corresponding Secretary*.—Dr. W. E. Page, Charlestown.

*Treasurer*.—Dr. E. Page, Charlestown.

*Librarian*.—Dr. J. T. Codman, Boston.

*Microscopist*.—Dr. R. R. Andrews, Cambridge.

*Orator*.—Dr. T. D. Shumway, Plymouth.

*Executive Committee*.—Dr. D. M. Clapp, Boston; Dr. R. R. Andrews, Cambridge; Dr. T. O. Loveland, Boston; Dr. A. B. Jewell, Newton; Dr. H. A. Baker, Boston.

W. E. PAGE, D.M.D., *Secretary*.

## NEBRASKA STATE DENTAL SOCIETY.

The fourth annual meeting of the Nebraska State Dental Society was held at Omaha, September 21 to 23, 1880. The following officers were elected for the ensuing year:

*President*.—A. W. Nason, Omaha.

*Vice-President*.—G. E. Douglas, Hastings.

*Corresponding Secretary*.—S. H. King, Lincoln.

*Secretary and Treasurer*.—W. F. Roseman, Fremont.

## STANDING COMMITTEES.

*Executive*.—J. W. Chadduck, A. S. Billings, D. A. Vance.

*Membership*.—I. W. Funk, E. I. Woodbury, G. W. Clutter.

*Publication*.—W. F. Roseman, G. W. Wertz, M. D. Thurston.

The next meeting will be held at Omaha, September, 1881.

W. F. ROSEMAN, *Recording Secretary*.

## CENTRAL PENNSYLVANIA DENTAL ASSOCIATION.

THE semi-annual meeting of the Central Pennsylvania Dental Association was held at Tyrone, Pa., Wednesday, January 5, 1881. The meeting was one of the most interesting ever held by the association.

J. D. GEISSINGER, *Recording Secretary*.

## BIBLIOGRAPHICAL.

FEVER: A Study in Morbid and Normal Physiology. By H. C. WOOD, A.M., M.D., Professor of Materia Medica and Therapeutics, and Clinical Professor of Diseases of the Nervous System in the University of Pennsylvania. Quarto, pp. 258. With Plates. Philadelphia: J. B. Lippincott & Co., 1880.

This memoir has been reprinted by permission from the stereotype plates of the Smithsonian Institution "Contributions to Knowledge," No. 357. The author claims that the volume is the outcome of labor which has occupied during many years all the hours that could be spared from pressing professional engagements,—a statement which we have no difficulty in accepting in view of the prodigious amount of work evidenced in it. The subject is discussed in four chapters, as follows: "The Essential Symptom of Fever," "Concerning the Methods by which the Animal Organism Controls the Production and Dissipation of Heat," "The Thermic Phenomena of Fever," and "The Theory of Fever." The author gives carefully tabulated reports of one hundred and twenty-one experiments on dogs, cats and rabbits, with observations as to time, temperature, *post-mortem* results, etc. These experiments seem to have been most carefully and scientifically performed, the phenomena accurately noted, and the deductions therefrom intelligently made. In his concluding chapter the facts which the author believes to have been demonstrated are marshaled, and the following theory of fever announced:

"It is simply a state in which a depressing poison or a depressing peripheral irritation acts upon the nervous system which regulates the production and dissipation of animal heat; a system composed of diverse parts so accustomed to act in unison continually in health, that they become, as it were, one system, and suffer in disease together. Owing to its depressed, benumbed state, the inhibitory center does not exert its normal influence upon the system, and consequently tissue-change goes on at a rate which results in the production of more heat than normal, and an abnormal destruction and elimination of the materials of the tissue. At the same time the vaso-motor and other heat-dissipation centers are so benumbed that they are not called into action by their normal stimulus (elevation of the general bodily temperature), and do not provide for the throwing-off of the animal heat until it becomes so excessive as to call into action by its excessive stimulation even their depressed forces. Finally, in some cases of sudden and excessive fever, as in one form of the so-called cerebral rheumatism, the enormous and almost



instantaneous rise of temperature appears to be due to a complete paralysis of the nervous centers presiding over heat-production and dissipation."

**DRAINAGE FOR HEALTH; or, Easy Lessons in Sanitary Science.** By JOSEPH WILSON, M.D., Medical Director U. S. Navy. Philadelphia: Presley Blakiston; 1881.

This volume, as we are informed in the preface, is intended to meet the wants of the public with reference to the topics indicated in the title. It treats of land drainage; of the drainage of the farm-house, of the village, and of cities, with a chapter on plumbing. The subject is one so commonly neglected, and yet is of such general importance that we advise those who desire to have an intelligent appreciation of a matter so closely related to the health of the house and of the village or city to make themselves familiar with the instruction here given.

**ROCKY MOUNTAIN HEALTH RESORTS.** An Analytical Study of High Altitudes in Relation to the Arrest of Chronic Pulmonary Disease. By CHARLES DENISON, A.M., M.D. Boston: Houghton, Mifflin & Co., 1881.

The author of this book, accepting the assertion of Montesquieu that "The empire of climate is the most powerful of all empires," and being thoroughly convinced of the superior advantages possessed by inland elevated sections for certain classes of chronic pulmonary diseases, endeavors to assist to an intelligent understanding of the class of cases likely to be benefited, and to establish the discrimination which will prevent doubtful experiments in those cases likely to be injured rather than advantaged by a journey to these elevated plateaus. Those suffering from pulmonary affections and contemplating a change of climate will find much valuable information in this volume.

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## OBITUARY.

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### ACTION OF THE DENTAL PROFESSION WITH REFERENCE TO THE DEATH OF DR. SAMUEL S. WHITE.

#### OHIO STATE DENTAL SOCIETY.

THE following was adopted by a rising vote at the session of the Ohio State Dental Society, held at Columbus, December 9, 1880.

W. H. SILLITO, *Recording Secretary.*

Since our last annual meeting, and shortly after its adjournment, the practitioners of dentistry throughout the civilized world were shocked and saddened by the announcement of the death, at Paris, France, from congestion of the

brain, of our esteemed friend and co-laborer, Dr. Samuel S. White. Although distant from home, his last hours were cheered and the bitterness of death was mitigated through the loving ministrations of a son and daughter, who had accompanied him.

When the cable transmitted the sad intelligence of his death, many hearts were burdened with grief in sympathy with his bereaved family.

No words eulogizing Dr. White are needed here. His career is known to us all—a noble life. The sterling character of the man; the uniform worthiness of his aims; his energy and industry; his conscientious, earnest, and persistent endeavors to benefit the dental profession; his upright and generous dealing, furnished an example worthy of imitation by us all. A record of his manliness and worth is engraved upon the hearts of all who knew him, and deepest in the memories of those who knew him best.

Cherishing appreciative and affectionate remembrances of our personal and professional relations with Dr. White, we desire to assure his family of our unfeigned sympathy with them in their affliction, and to place on record this testimonial of a sincere esteem and love for our departed friend.

F. H. REHWINKEL,	} <i>Committee.</i>
J. TAFT,	
G. W. KEELY,	

#### NEBRASKA STATE DENTAL SOCIETY.

At the session of the Nebraska State Dental Society, held in Omaha, September 21 to 23, 1880, a committee, consisting of Drs. A. S. Billings, S. H. King, and M. D. Thurston, reported the following resolutions, which were adopted:

*Resolved*, That, as members of the Nebraska State Dental Society, we desire to express our deep sense of the loss and sorrow over the death of our friend and brother, the late S. S. White.

*Resolved*, That this society, at its earliest opportunity, joins in giving expression to its high regard for his memory, as one who endeared himself to the profession through his untiring and self-sacrificing labors in its interests.

*Resolved*, That we most sincerely mourn his loss, and send our heartfelt condolence to his family.

#### DR. SAMUEL WHEELOCK PARMLY.

Died, at New York, December 15, 1880, of rheumatism of the heart, Dr. SAMUEL WHEELOCK PARMLY, in the seventy-fifth year of his age.

DR. PARMLY was born in Braintree, Vt., September 16, 1806. He was one of five sons of Eleazar Parmly, four of whom practiced dentistry. Three of the brothers had at one time an extensive practice in London. One of them (Levi) practiced in New Orleans, and one (Eleazar) for more than thirty years stood at the head of his profession in New York. With the latter Samuel pursued his professional studies. Dr. Parmly had practiced continuously in New York since 1838. He was a man of integrity, cultivated taste, and very considerable literary ability.

**DR. GEORGE SMILLIE.**

Died, at Plainfield, N. J., December 29, 1880, Dr. GEORGE SMILLIE, aged sixty-nine years and seven months.

DR. SMILLIE was born in Edinburg, Scotland. He came to this country and settled first in Quebec, Canada, in 1819. Soon after he directed his attention to the study of dentistry, and practiced his profession in Canada until the year 1832, when he located in the city of New York and secured a large practice. In 1871 he located in Plainfield, N. J., where he continued to practice his profession until the time of his death. Dr. Smillie was an estimable gentleman and an excellent dentist, making a specialty, however, of mechanical dentistry, in which he enjoyed a high reputation.

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**PERISCOPE.**

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**TRANSPLANTATION.**—In a recent article on Transplantation and Replantation we called attention to the well-known fact, viz., that a tooth's vitality is maintained by two sources: 1st, the vascular and nervous supply to the pulp; and 2d, the vascular and nervous supply to the alveolo-dental membrane. Of the hard tissues, the dentine, and, if we accept the views of Bödecker, the enamel, rely solely and the cementum partially on the former; the main supply of the last named being derived from the latter source. In the process of pivoting, root-filling, etc., it was shown that the supply to the dentine, and enamel (?) through the vessels and nerves of the pulp was completely cut off; nevertheless, the cementum existed as a living structure,—not, however, always in a perfectly healthy condition, as evidenced in its hyperesthetic state manifest when subjected either to mechanical irritation or changes of temperature. On the other hand, though more rarely, the cementum may have lost its vitality, while the remaining hard structures have not. A tooth may have a living pulp while one or even two of its roots may be wholly detached from all living structures. An instructive case, bearing on this subject, came under our notice some few years ago; a lower third molar which had given considerable pain, and which was, on percussion, free from tenderness, and gave the clear ringing sound indicative of a healthy periodontum, presented on the masticating surface a small superficial decay which appeared the only, but not satisfactory, cause for the amount of pain endured. The cavity was ground out with the bur-engine, the dentine proving very sensitive, and then filled with gutta-percha, as the least irritative material that could be employed; the pain continuing, the tooth was eventually removed. When split open the pulp was found perfectly healthy, being separated from the carious cavity by a considerable thickness of sound dentine, but on the anterior surface of the root—a single one—was a patch of dead cementum occupying about one-third of that surface. The tooth had been long and tedious in erupting.



In the operation of transplanting living teeth, we have stated that we can rarely hope for both sources of vitality being preserved; we rely upon securing that only of the cementum, furnished by the vessels and nerves of the alveolo-dental membrane. That this membrane, or portions of it remaining upon the root of a tooth, may, under favorable conditions, become united to the same structure in the alveolus of another person is, we think, quite as probable as is the transference of living bone, periosteum, or skin from one body to another; and, although we have never had the opportunity of removing a tooth so transplanted while continuing in a satisfactory condition, we have not the least thought that it would be otherwise than attended with the same resistance to our efforts, or afford the same amount of hemorrhage as a tooth the pulp of which had been destroyed.

For some years attention has been devoted to the subject of transplantation, and several cases have been carried out both at St. Bartholomew's and the Dental hospitals. We regret that these cases have not been traced out as carefully as the importance and interest of the subject demand; the fault, however, lies more with the patients who have failed to present themselves as requested than with those who carried out the operations. In the St. Bartholomew's Hospital Reports for 1878 is a paper by a member of the staff upon this subject. After alluding to the experiments of Hunter, and discussing the reasons which led to the discontinuance of the operation, and of which, we think with the writer, "the moral" one was the most potent, attention is directed to the fact that many thousands of healthy teeth are, in the present day, removed for the relief of overcrowded jaws, and which might be turned to profitable account. Seven cases of transplantation are recorded as carried out under the hands of the writer, one of which was a double case,—that is, where two lateral incisors removed from a child of about twelve were transferred to a youth of sixteen. At the time the paper was written one case only was known to have failed. The first case recorded had been done about two years previously, and we learn that this was recently seen and was quite satisfactory, making it a period of over four years' duration.

The paper also records five additional cases carried out by another gentleman connected with St. Bartholomew's Hospital, of which, at the time of writing, four had proved successful.

Simpler and easier is the process of replantation, especially where the tooth to be replanted is one that has not suffered from disease and which can be returned to a healthy and uninjured alveolus, as in the case of a sound tooth accidentally extracted. The teeth in such cases often appear to continue as sound and serviceable as other teeth, but that few of such cases are recorded has an obvious explanation. In the cases where teeth removed by violence—falls, blows, etc.—have been returned to alveoli more or less injured, these have often become quite firm and serviceable for many years,—ten, at least, to our own knowledge.

Teeth removed on account of caries, occurring in spots inaccessible for filling, especially if much affected by the disease, will have a smaller chance when replanted, filled, than sound teeth, as there will probably be more or less unhealthy dentine in contact with the

cementum, and still smaller will be the prospect of success when the pulp has been for any time in a disorganized state.

The least favorable condition for replantation will be when the cementum has become affected, and is more or less necrosed, and yet it is probably in such cases that the operation would prove most valuable could it be generally resorted to. The treatment of periodontitis, which, although it may arise from rheumatism, syphilis, salivation, general stomatitis, etc., is most frequently the result of unhealthy cementum consequent on carious dentine, has under the latter conditions proved the most intractable affection the dental surgeon has had to contend with. When teeth in this condition are removed, their roots are generally seen divested of alveolo-dental membrane about their apices, the cementum of which is dead; approaching the neck of the tooth, the same membrane, although attached to the cementum, is unusually thickened and softened, and its fibrous structure infiltrated with lymph and white blood-cells, while about the neck of the tooth, and where the structure assumes more the condition of mucous membrane, it is firmly adherent, and apparently healthy. In attempting to treat such cases by replantation, some practitioners, after the removal of the tooth, and necessary filling,—the root-cavities with antiseptic material,—proceed to scrape off the dead cementum, and much of the diseased membrane, carefully avoiding injury of the healthier portions at and about the neck of the tooth; the bare portions of the root or roots are immersed for a short time in an antiseptic fluid, and the tooth thus treated is returned to its alveolus. Other practitioners, we believe, simply content themselves, in regard to the treatment of the root or roots, with cutting off a portion or the whole of the bared extremity. If the proportion of success in these cases be, in the long run, other than great, it must be borne in mind that it is attempted for a disease almost fatal to the welfare of the organ, and for which other attempted means of cure are lengthy, distressing, and probably equally uncertain; it is probable that experience, and improved methods of manipulation, may in time lead to a greater ratio of success.—*Editorial in Monthly Review of Dental Surgery.*

“DENTAL SURGEONS,” “SURGEON-DENTISTS,” ETC.—It is interesting to notice the many proofs of ignorance or carelessness on the part of the public in reference to the working of the “Dentists Act.” So far from that statute having any protective value for the community, it is, as we predicted it would and asserted it must be, a delusion and a snare. At present the Dentists’ Register is a list of all the persons, with or without knowledge and qualification, who were, or claimed to be, in the habit of tooth-drawing or making at the passing of the Act. Hereafter, that is to say, when the present race of “Dental Surgeons” shall have died out, the Register will comprise the names of those imperfectly-educated and half-qualified persons who are simply licentiates in dentistry and nothing more, together with such fully-qualified *surgeons* as may elect to have their names classed with the professors of a “specialty,” which, in so far as it is *surgical*, cannot in the very nature of things have any *really* independent existence. We venture to think the number of medical men so minded will be exceedingly small. Meanwhile the

drawers of teeth and hewers of jaw-bones luxuriate in the possession of a Register on which we regret to find the names of a few surgeons. They also call themselves "Surgeon-Dentists" and "Dental Surgeons" at pleasure, although there has been nothing surgical in their education, and they have no conceivable right to the title they claim. It is amusing to find members of the profession who short-sightedly or perversely agreed to accept the absurd phraseology of Sir John Lubbock's bill, and, forsooth, thought it could "do no harm," now complaining of the results. They are simply the inevitable consequences of a serious misconception of the facts and a false policy. It would be ridiculous to pretend that we commiserate the surgeons, or greatly blame the "dentists" who have taken advantage of their weakness. At the same time we do pity the public who are victimized. The sooner qualified men take their names off the Dentists' Register and open up some new mode of marking themselves off from the mass of specialists, the better will it be for the country at large and a branch of the medical profession which has been practically stultified.—*The Lancet*.

VALUE OF DEPENDENT POSITION OF THE HEAD IN OPERATIONS ABOUT THE MOUTH AND THROAT.—Eighteen months ago, when removing the greater part of the lower jaw, including its symphysis, I tried the plan of allowing the patient's head to fall over the edge of the table. Although the tongue immediately fell back towards the posterior wall of the pharynx after the attachments of the tongue to the jaw had been freely divided, the man's breathing was perfectly easy, much more so than when the head was raised or lay level with the trunk. Before the patient left the theatre I demonstrated this fact several times to the students present, and thoroughly convinced them and myself of its correctness.

The experience of this case led me to place the head in the same position in my next operation on the throat (thyrotomy); and since then I have performed many operations in this way on the mouth and throat with complete success, and with great facility as regards the prevention of blood passing into the air-passages, the obtaining of a good view of the parts, and the carrying out of the necessary manipulations.

Among the operations in which I have used this method have been, a second case of thyrotomy, two cases of tumor of the palate, one case of large epulis, and three cases of cleft palate. In all these operations I have been impressed with the advantages of this position of the head. Complete anæsthesia by means of chloroform, or a mixture of chloroform and ether, has been kept up without any inconvenience during the whole proceedings.

My present method of keeping the head in this position is to have it hanging over the end of the table and supported there by the hands of an assistant; but I am having a little addition made to my operating-table, which will allow the head to be supported in this position more efficiently.—*Professor Annandale, Edinburgh, in The Lancet*.

CLASSIC DENTISTRY.—Dr. Xavier Landerer, of Athens, sends the following to the *London Chemist and Druggist*: "It may be safely asserted that the ancients certainly cleaned their teeth and used



tooth-powder. If the necessary attention were given, relics would be found in the graves of the women. The word *odontotrimma*, the tooth-scouring stuff or tooth-powder, is found in ancient Greek, and in the Greek Pharmacopœia is applied to tooth-powder. It is interesting to find that the ancients had made some advance in dentistry. A friend of mine (now dead) occupied himself in collecting ancient Hellenic skulls, wishing to show that they did not differ in shape from those now carried in Greece. Among several hundreds of these skulls, some perhaps two thousand years old, we found two with 'stopped' teeth. One was filled with a mass as hard as stone, which, on analysis, proved to be hydraulic lime, made from volcanic ash, Santorin earth, and lime. Marvelous as it may seem, the hollow of one tooth in the other skull had been filled with gold thread or gold-leaf. The metal used was pure. The skull itself, though deprived of the stopping, is now in the Archæological museum.—*The Pharmacist.*

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## HINTS AND QUERIES.

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"He that questioneth much shall learn much."—BACON.

CORRESPONDENTS desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

WILL some one of practical experience tell me if a partial lower set of teeth can be made a success, *and how*? I have a case presented. Male, 35 years old. Molars all gone on the right side. Can a plate be worn in this case?—A. A. ALLEN.

I SHOULD like to know if a galvanic battery amounts to anything in the extraction of teeth,—that is, can a tooth be extracted with less pain to the patient by the use of the galvanic current?—W. T. J.

WHAT metals and proportions make the stiffest clasps or linings for plate teeth? Which will undergo the least change in the mouth?—A.

WILL some one tell me what battery to use, and how and when to apply the same, in case of suspended animation from the use of an anæsthetic?—J. T. W.

WILL you please publish a list of the States in which laws regulating the practice of dentistry are now in force in this country?—A. W. HARLAN.

The following States have laws regulating the practice of dentistry, and no others, so far as we are aware, though legislation is agitated in several: Alabama, Georgia, Indiana, Kentucky, Louisiana, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, and South Carolina.—EDITOR DENTAL COSMOS.

ANSWER to Z. I. N.—While it is concluded that carbolic acid or creasote with cotton will answer the purpose as long as the carbolic acid or creasote is present,

it will in time be taken up by absorption and the cotton left alone; gas will generate, which will reproduce the trouble. This stage of periodontitis will be more difficult to treat than the first. Gold, cement, or gutta-percha will fill the canal and the formation of gas be avoided. If Z. I. N. will take the pains to fill a tooth prepared for filling in the ordinary way, without filling the nerve-canal, he will soon see the result of the illustration.—J. D. UNANGST.

W. F. S. asks in Hints and Queries (December number of the DENTAL COSMOS) for "a formula of an amalgam that has been tested and found to possess the requisite qualities for the desired end, viz., the salvation of decayed teeth." He can obtain the formula of any amalgam he pleases from a good analytic chemist for about \$5. But if he had the formula, he could not produce an amalgam having the qualities of one made from the same formula by an expert.—A. BERRY.

REPLY TO C, who asks, "What is the best method to remove teeth from a vulcanite base?" etc. Fill the lower half of your rubber flask with white sand, imbed the plate in the sand and apply heat. When you hear a crackling noise it is an indication that the rubber is sufficiently softened. Seize the plate with a pair of pliers, and with an old excavator carefully inserted at the upper edge of the gum (if gum teeth), or at the top of the tooth (if plain), the task can be satisfactorily performed without breaking teeth or cracking gums.—HYMAN ROSA, M.D.S., Rondout, N. Y.

C. WANTS to know how to remove teeth from vulcanite base. Heat the plate in an oven until the rubber becomes soft, when the teeth can be separated from it with the greatest ease. Celluloid can be treated in the same manner.—A. V. H.

USE OF TOBACCO.—In answer to Student (January number of the DENTAL COSMOS), the following, by James Hardie, from the *British Journal of Dental Science*, may be quoted as pertinent to the question: "Some people have the idea that smoking causes decay in the teeth, but this is quite erroneous, as it is an indisputable fact that tobacco is a powerful alkaloid; therefore its use must in a great measure tend to neutralize any acids which may collect around the teeth, and this prevents decay. As a rule I find that smokers have good teeth, and where attention is paid to cleanliness they can be kept free from discoloration."—C. D.

ANSWER TO W. R. P., who would like a remedy for excessive sweating of the hands. The following may be used with great confidence:

R.—Cologne, f℥ iiii;

Tinet. Belladonnæ, f℥ ss.—M.

S.—Use twice or three times per day, rubbing one to two drachms on the hands each time.

Two days' time will cure the most obstinate case. When used to check sweating of the head or face, to avoid constitutional effects, too much should not be applied at a time. It is equally as effective in checking obstinate secretion, or foul sweating of the feet. The cure is due to the belladonna, and not to the spirit, as has been experimentally proved. The cologne is an agreeable-smelling vehicle, and this is preferable to the ordinary liniment.—D. W. EDGERLY, D.D.S.

IF W. R. P., who complains of excessive sweating of the hands, will bathe them with alcohol before retiring for a few nights, he will, I think, overcome the trouble.—J. F. R. D.

A CASE of fistulous opening in the shoulder (reported in the DENTAL COSMOS for December) reminds me of a case which occurred in my own practice. A lady called on professional business, accompanied by a female friend from the West. I noticed a fistulous opening in the right cheek of the visiting friend, and remarked to her casually that she was suffering from a tooth trouble. She assured me that she had no trouble whatever from her teeth, and that the fistula was the result of an ulcerated sore throat, for which she had been under treatment for three years, the discharge having kept up during that whole period. Begging permission to examine the mouth I found the right inferior second molar, though apparently sound, entirely dead. The lady, very much surprised at this information, at once agreed to its extraction. Result, a speedy cure of the throat trouble.—A. V. HARTLEVAN, D.D.S.

GOLD CROWNS.—In an article, vol. xxii., page 463, DENTAL COSMOS, Dr. Eugene S. Talbot gives the credit for the suggestion of "Gold Crowns" to the late Dr. B. Beers, of California, who received a patent for his invention in 1873. The writer seems to think that all other claimants have but reproduced his invention. To set the matter right before the profession, permit me to copy an article of my own, which appeared under the title "A New Operation," over the signature "N." in vol. i., page 184, of the *Missouri Dental Journal*, May, 1869:

#### "A NEW OPERATION.

"Miss W. came to me with a first left lower molar decayed to the extent that the entire lingual and a greater part of the labial surfaces below the gum were removed. The roots were filled properly with gold, and the crown had been filled several times; the last time the crown was built-up in good style, but the two walls being of such a shape that they could not be made self-sustaining, I took a natural tooth corresponding as nearly as possible in size and shape to its fellow of the opposite side, and imbedded its roots in plaster to make a model from which to get a metallic die over which to swage a gold cap. I used a thin piece of pure gold-plate, cutting it at the corners, giving but a slight lap for soldering after it was perfectly fitted to the die. I then fitted this cap accurately to the remaining portion of the tooth in the patient's mouth, allowing it to extend under the free margin of the gum quite to the alveolus, which was about the thirty-second part of an inch below the margin of decay. After soldering a bar across the cap from the lingual to the labial surfaces, it was finished and polished at the lathe. I then prepared the patient's mouth as usual for filling; made a thin paste of oxychloride of zinc, filled the cap, and pressed it to its place; the superfluous cement was crowded out of the cap and removed at the margin of the gum. I had the pleasure of seeing that tooth to-day, nearly four months after the operation, and had the gratification of seeing and hearing it pronounced a perfect success."

This shows that gold crowns were used in my office four years before Dr. Beers's invention was patented. I am informed by Dr. H. Judd, who was editor of the *Journal* at that time, that twenty-five copies of that volume of the *Missouri Dental Journal* were taken by California dentists, Dr. Beers being one of them. Though since that article was written there have been many varieties of gold and platinum crowns made in my office, scarcely two out of several hundred have been made exactly in the same way. I nearly always work to a plaster model of the root and the adjoining and occluding teeth, and shape over gray iron dies made from crowns of natural teeth, modifying them to suit different cases.

This subject was brought prominently before the profession during my absence abroad, and I am sorry that my professional brothers have made it necessary for me to write in my own defense. For this reason, I am a believer in patents by inventors, and regret that I did not patent that and several other good things that are now yielding profit and honor to others.—WM. N. MORRISON.



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No. 3

ORIGINAL COMMUNICATIONS.

THE POSITION THAT DENTAL AND ORAL SURGERY IS DESTINED  
TO OCCUPY IN AMERICA.

BY TRUMAN W. BROPHY, M.D., D.D.S.,

CLINICAL LECTURER ON DENTAL AND ORAL SURGERY IN CENTRAL FREE DISPENSARY, RUSH MEDICAL  
COLLEGE, CHICAGO.

(Read before the New York Odontological Society, February 15, 1881.)

THE rapid advancement of the art and science of dental and oral surgery during the past quarter of a century has probably not been surpassed in the annals of history. The earnest, thoughtful, progressive practitioner, who loves his vocation and desires to aid in its advancement, cannot find another subject upon which his energies may be expended to such advantage as in laboring to elevate dentistry and place it before the whole world side by side with the other departments of art and science. What is dentistry, or,—a better name,—dental and oral surgery, as recognized by the world to-day? (I say dental and oral surgery because this term more clearly represents, or indicates, the tissues upon which the educated dental surgeon is called on to operate.) By a few of the more intelligent it is, as it should be, accepted as a science as well as an art; but by far the greater number of well-educated people,—people possessing extensive information on nearly all other subjects,—cultured people, some, indeed, who occupy prominent places in the learned professions,—men distinguished for their classical education and attainments,—really believe that the practitioner of dentistry is pursuing a menial vocation, and is simply an ordinary mechanic. Such being the views of some of the more intellectual, what may we expect from those who occupy less prominent places in society?

Let us look for a moment at the condition of dentistry in this country and see if our friends are not, to some extent, at least, justified in their opinion of us. There are, in thirteen States, laws to

regulate the practice of dentistry; in the other States, including Illinois, any one who so elects, even though he can neither read nor write, may place out a sign and enter upon its practice. So long as this condition of things is permitted to exist it is not reasonable to expect the laity to recognize dentistry as having any claim to the name of a profession or any part thereof, or to place it on a par with the universally-accepted learned professions of the world.

The work so well and faithfully performed by our eminent American dentists in conducting institutions of dental learning, as well as in establishing and successfully maintaining dental associations, has resulted in Americans justly receiving acknowledgments from the whole dental world as excelling in this department of art and science. Upon these men, who have conscientiously labored, devoting their lives and fortunes to their efforts to advance a branch of science,—some of whom, owing to their assiduous exertions, now rest in untimely graves,—too much honor cannot be bestowed.

Notwithstanding the great advancement made in dentistry by the efforts of the energetic men who are and have been engaged in its practice, I cannot but think that the course so long pursued in regard to dental education and association falls far short of what it should be. There is no doubt that dental surgery is a *specialty* of medicine; and, holding that belief, *we should at once take steps to place our specialty side by side with other special branches* of medical learning. Can this be accomplished? What shall we do to verify the clause which appears in the Code of Ethics of the American Dental Association, to-wit, "Dental surgery is a specialty in medical science," etc., etc.? Can we secure for dental and oral surgery recognition as a medical specialty equal to that so universally accorded to ophthalmology, otology, gynecology, etc.? Most certainly we can! Can it be done by establishing new societies of dental surgeons and admitting only men who are M.D.'s? Not by any means. While all credit should be given to the distinguished gentlemen of Boston,—doctors of medicine practicing dental and oral surgery,—who have wisely formed "The Society for the Advancement of Oral Science," its good results will probably be largely of a local nature, though its influence may extend far beyond the city of Boston and become a stimulus to similar societies. It will be impossible to place the specialty of dental and oral surgery on a par with other medical specialties by organizing such societies, it matters not how eminent their members may be, how high their standard, or how exacting their requirements for admission to their ranks.

There is, undoubtedly, but one way by which dental and oral surgery can be placed in the position of equality with the other recognized medical specialties, and that is by bringing it within the

province of the American Medical Association, made up as it is of the most distinguished medical men upon the American continent; men, indeed, representing every State in this broad Union; men representing *every* specialty of the science of medicine except ONE. Who are these medical specialists that are so negligent as to suffer their specialty to be the only one without representation in this the highest medical association of their land? Who are these medical men who have not considered their specialty of sufficient importance to carry their banner to the front and place it in line with those of other specialties? None others than the doctors of medicine who practice dental and oral surgery. Is this not true? And yet we claim to be medical specialists. I believe the time has come when we should *cast off* the scales from our eyes, realize our position as medical men, and *immediately* take steps to place our specialty where it belongs—in the American Medical Association. Warm friends will greet us there,—men whose names are familiar to every medical practitioner and student in every civilized nation of the earth. Such action will no doubt be taken in June next, at Richmond, Va., where the American Medical Association holds its next annual meeting; and when the section of dental and oral surgery is established, it will be the forerunner of a new era, in which dentistry in America will be elevated to a higher plane than it has heretofore attained. There will probably be opposition on the part of some of the members of the Medical Association to this procedure, but I am firm in the belief that this highly intelligent body will recognize the importance of such a section, and, therefore, receive us most cordially. We shall undoubtedly meet with opposition from our dental friends, who will argue that we should stand by dentistry for what it is. They will also speak of the absurdity of placing dentistry where physicians and surgeons may, if they desire, enter upon its practice, even though they are ignorant of all the manipulations so essential to a competent dental operator. To such arguments—and as many more as our friends deem advisable to enter into—we shall answer at the next meeting of the American Dental Association, which will occur in New York City the coming August.

Placing dental and oral surgery in a position where the whole world *must* accept it as a department of medicine, will make it a more exalted vocation, and a greater number of men of higher intellectuality will be found in our ranks than would ever come under the present *régime*. It will add a new impetus to thought and investigation. It will be an incentive to young men who aim to be thoroughly qualified to practice dentistry, to educate themselves as doctors of medicine in conjunction with their dental training. With



this accomplished we shall be accepted as medical men practicing a specialty of medicine. We shall no longer be erroneously called the "dental profession," any more than ophthalmologists should be said to belong to the ophthalmological profession or dermatologists to the dermatological profession; but we shall, in common with the others, be medical men,—doctors of medicine with all the title implies,—practicing a specialty thereof not second in importance to any.

The plan here proposed, and which will in all probability be carried out, is as follows: All regular physicians practicing dental and oral surgery are requested, if they are in sympathy with this movement, to join their county medical society (if they are not already members), get their credentials to the American Medical Association, go to Richmond, Va., where it convenes in June next, when a section on dental and oral surgery will be organized, and application be made to the association for admission. If there be any prominent member opposed to this course, I have neither seen him nor heard from him. I have in my possession letters, in answer to mine, from some of the most distinguished members, requesting their views of the scheme, containing such expressions as the following: "I wonder why this was not done long ago." "Dental surgery is as much a department of medicine as ophthalmology, and consequently should have representatives in the American Medical Association, *provided they are medical men.*" "I am glad to see that you have at last realized what you are, and are now ready to do your duty, as you have expressed it to me, and return home to your mother who gave you birth."

I might quote pages from eminent men engaged in general practice, as well as from those engaged in all the specialties, including ours, but these I have given are fair samples of the whole number. That I may not be misunderstood, I wish to say that the American Dental Association is, and probably always will be, the only truly national association of dentists in this country, and it is indeed a high honor to any dentist to hold membership therein.

The time will doubtless come when every member of this association will be a medical man,—an M.D. An impression must not go out to the effect that we are in the least dissatisfied with the American Dental Association. Not so by any means. The grand work achieved by that body will adorn the pages of the history of dentistry many years after our children's children have passed away, and other minds are grappling with and endeavoring to solve the great and ever-absorbing problem of professional advancement.

While a large majority of its members are not medical men, we shall feel that it holds a position corresponding to that occupied by the American Gynecological Association, the American Dermato-

logical Association, etc.; but, like these latter associations, we, too, should have members of our specialty in the American Medical Association, the *only* great national association for all medical practitioners, either general or special.

Injustice would be done to ourselves if this paper were concluded without claiming that we shall impart much information to our associates in other departments of medical science, and furnish them with valuable papers upon the *most prevalent* of *all* diseases,—diseases which lead to more suffering than any others known to civilized man,—diseases, indeed, the etiology of which the general practitioner has studied but little, for want of time, but which not infrequently originating in distant organs of the body, manifest themselves in the teeth or maxilla, and *vice-versa*. The facial neuralgias which prevail to such an extent are largely due to dental lesions, and too often irretrievable losses have been sustained by patients without just cause.

It is for these, with other reasons previously stated herein, that a section should be formed on dental and oral surgery in the American Medical Association. No one can justly claim that the American Medical Association conflicts in any way with the good work accomplished by the American Dermatological Association, or the American Ophthalmological Association, or the American Gynecological Association, or other associations whose work is upon special subjects pertaining to the science of medicine.

Such will be the relation of the American Medical Association to the American Dental Association. Working together hand in hand in one common cause, with one motive, we shall go forward, mutually acquiring that knowledge which will make us better, and enable us to stand before the world conscious of having used our combined talents to the extent of our ability to advance the most noble of all professions,—whose existence is dedicated to the alleviation of human suffering and the promotion of the happiness of man.

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## DENTAL EDUCATION.

BY D. D. SMITH, D.D.S., M.D., PHILADELPHIA, PA.

(Read before the Pennsylvania State Dental Society at Bellefonte, Pa., July, 1880.)

EDUCATION is a term of varied meaning. Much or little may be involved in it, according to the standard or stand-point from which it is viewed.

In its full meaning education is of three kinds,—physical, mental, and moral. The training involved in the education of these three capacities or natures is dissimilar in kind and that of each may be independent of the others.

Monstrosities are often produced by a marked preponderance in physical training or of mental cultivation, unrestrained and unguarded by a wholesome recognition of moral obligations.

To subserve its highest ends education should harmonize and so perfectly blend these capabilities and capacities of body, mind, and soul, neither being cultivated at the expense or neglected to the advantage of the others, that true manhood, in its physical proportions, mental capacities, and moral activities may result.

Such blending effected, effort should proceed specially towards a preparation for the duties in life to be assumed,—agriculture, mechanics, law, medicine, politics, or theology being the governing theme, according as an avocation may have been chosen,—for the farmer should know more of agriculture than of mechanics, the lawyer of statutes than of disease, and the theologian of moral obligation than of politics.

Reason, analogy, and experience all teach that oneness of effort and concentration of purpose alone can achieve the highest success.

The lawyer is esteemed educated in proportion to his knowledge of law coupled with ability to use that knowledge; the physician in proportion to the skill exhibited in combating disease; the theologian as he leads the way to those lofty themes and noble deeds which lift the soul to its Creator. And so the dentist must be educated *best* who best performs the *duties* of dentistry.

But what is the *office* of dentistry? Is it preaching or conducting legal cases at the bar? Is it assisting women in child-birth or going from house to house attending the sick? Is it not rather meeting the necessities and demands of those who suffer from dental disease or from the loss of teeth?

However narrow or circumscribed as an avocation this may *seem*, it must in all candor be admitted that such is the practical work of dentistry.

The special education, if any, demanded for dentistry, and how best to attain it, becomes, then, a matter of no little consequence to the future of the profession. The term "profession" rather than "specialty" is here used advisedly, for, to all intents and purposes, dentistry is, and in the nature of things must be, a separate and distinct calling rather than a "specialty of medicine."

It is now plain of recognition that the great science of medicine and surgery, wrestling with the intricate and unsolved problems of the human system, failed, at the opportune time, to comprehend the importance which attaches to the care and preservation of the teeth, as it utterly refused to make provision for the study or treatment of their diseases.

When, a few years ago, respectable and medically-educated dentists



requested admission to a medical association, and educational provision through some legitimate and efficient means for those who wished to devote their energies to this department, they were refused admittance *because they were dentists*, and their request for educational facilities was spurned with contempt as beneath the dignity of the medical staff. All the while the necessities of the community were crying aloud for help which the medical profession could not bestow. Sufferers were compelled to seek such aid as could be found, and of necessity they accepted that of the *unskilled*, in whose hands, in the main, dentistry then was.

Nothing daunted, a few resolute men, recognizing the importance of systematic training and culture, resolved to establish a college for the education of *dentists*; and acting in conformity with this resolution, the first dental college was chartered by the State of Maryland, and located in the city of Baltimore, in 1839.

When we contrast the condition of our profession to-day with that existing prior to this important movement, we can but feel that the *seeming* evil of separation from the mother science has been over-ruled for good to suffering humanity and to the credit of general medicine as well. It is believed that the history of no other profession offers a parallel to the remarkable forward strides taken by the dental profession in the last twenty-five years.

Had it been chained to the ponderous wheels of general medicine its progress would not—*nay, could not*—have been so marked. Dentistry now is, and demands to be, as much a matter of special collegiate training as medicine or surgery.

It has the same object in view,—the relief of suffering and the bestowal of comfort. Its methods are *separate, original*, and distinct. That dentistry to-day stands out before the world an honorable and useful profession, indispensable to the comfort, health, and longevity of civilized man; that it covers a field of usefulness, broad and comprehensive, unexplored and unknown to any other, is due to its own inherent and developed energies. Dentistry has given much but borrowed little. Its discoveries were made within its own ranks; it has created a literature, founded and sustained colleges which have drawn to this country students from nearly every nationality on the earth. It has made and applied its own pharmacopœia; it has produced wondrous combinations of metals, chemicals, and minerals; it has harnessed *water, steam, and electricity* to do its bidding, and provided the most cunningly-adapted devices for the more perfect accomplishment of its ends. It has successfully grappled with diseased conditions which have found neither relief nor intelligent treatment at the hands of the general practitioner. It has educated the medical profession, and in no small degree the

public, into a recognition of the great importance of a healthful condition of the oral cavity.

Through the indefatigable perseverance of Dr. Horace Wells, the inestimable boon of anæsthesia was conferred upon the world, and thus complete immunity from suffering was bequeathed to those compelled to endure operations at the hands of the surgeon,—a contribution to humanity greater than any which preceded or has followed it.

Dentistry has *passed* the ordeal of its *novitiate*, and now exhibits before the world all the paraphernalia and appliances of the older professions.

Every true dental college has labored and will labor to make the synonym of dentistry oral surgery—medical training with special reference to the oral cavity. It is *this* teaching which has already placed it in a position of such importance that public sentiment is ready to throw around its practice the protection of *law*. Such teaching made possible the passage of the recent Dentists Act of Great Britain, and has been the means of the enactment of laws for the protection of the public in this and other States of the American Union.

This being true, what agencies shall now be employed in educating young men coming into the profession, and for advancing the general interests of dentistry? Shall it be done through the instrumentality of private teaching? Shall the work be committed to medical colleges having the simple addendum of two dental chairs? or can dental education be more safely intrusted to those who alone have raised dentistry to the important position which it now occupies—to those institutions, the dental colleges, whose only interest is the furtherance of dental education and the advancement of dental science?

Public sentiment, wisely without doubt, is fast eliminating the first of these methods as a factor in dental education. The execution of laws already enacted, and those which in the course of events must follow, will ere long render so hazardous any attempt to enter upon practice without first earning a diploma, that few will care to incur the risk. Therefore, all discussion of means to be employed may be confined to the two classes of institutions now in operation.

It cannot be claimed in favor of dental education by medical colleges, that in point of numbers dental colleges are inadequate to the demands, as in this respect there is abundant room for all who will to enter by this door into the profession.

The whole question then rests upon the facilities afforded students of dentistry at medical colleges in comparison with the same in our

dental colleges, and the ability of a medical faculty to teach dentistry in contrast with the ability of a dental faculty to do like work.

First. Let us consider the facilities for dental education in medical colleges in contrast with the same in dental colleges.

Medical institutions, teachers, journals, and graduates have for years exhibited for dentistry and its practitioners a contempt which is as ill-disguised as it is unwarrantable. All claims of dentistry to the dignity of a profession or to that of being a branch of medicine have been treated as innovations, and a disregard has been evinced for its discoveries and teachings, and a superiority assumed which has tended to make the separation of the two callings more widely distinct and permanent. Therefore medicine has, in its museums, teachings, or surroundings, very little which can be made directly conducive to the interests of dentistry. The central thought of medical colleges is *medicine* and *surgery*, and all teaching is shaped to this end. The central thought of dental colleges is *dentistry*, and all its plans and teachings are intended to advance the interests of that science. In a word, the atmosphere of the one is medicine and of the other dentistry.

The change which must take place in the air of a medical college before it can breathe of dentistry is a radical one, and can only come of actual reconstruction.

The organized efforts of dentistry have done much towards teaching medicine that dentistry reaches a department affecting comfort and health in a most important manner, which has been touched by no other science; and yet, during an attendance upon two courses of lectures at one of the first medical colleges in this country, I failed to hear from the lecture-stand one respectful allusion to dentistry as a science or as a branch of medicine, or a single reference to the teachings, discoveries, writings, or opinions of dental authorities. Is it, then, probable that the facilities afforded dental students at medical colleges for obtaining a knowledge of dentistry are in any way equal to like facilities afforded at our dental colleges?

Second. The fitness and ability of a medical faculty to teach *dentistry* as compared with a dental faculty to do the same.

The change in sentiment among medical men (especially teachers) upon the question of dentistry as "a branch of medicine" in the last five or eight years is something remarkable, and more especially does this present itself when we consider the opposition encountered in the past. Looking for the *cause*, we are unable to discover any agency through which it has been wrought, except the influence exerted by our dental colleges in the cause of education. How-



ever far beneath a desirable standard of excellence they may have fallen, or however far short of their privileges they may have stopped, they must still be credited with having raised dentistry to a position of such importance, and with having clothed it with such dignity as not only to *attract the attention* of medical colleges, but to *make it a professional prize coveted by the oldest universities in the land.*

It is a fact generally admitted by medical men, teachers no less than general practitioners, and one equally general in its recognition by dentists, that *he* who is *only* medically educated knows very little, and that little very imperfectly, in regard to the simplest matters engaging the attention of dentists. However much general medicine may teach that is important to life and health *not* taught in the dental curriculum, the fact remains that *dentistry* is no part of medical teaching. Much convincing testimony might be adduced in proof of this were proof necessary, but as no pretension to an understanding of dentistry is *now* made by medical men in *centers of medical education*, the citation of evidence is not demanded.

Can medical teachers, then, instruct in that of which they have no knowledge? It may be claimed that it is not the office of medical teachers to teach dentistry proper, but only the medical part of dentistry. Anatomy, it may be said, is the same, whether taught to dentists or physicians. This is true to a certain extent, but it is none the less true that anatomy, taught as it should be, *and as it is*, by a medically-educated dentist to a class of dental students, will have a meaning and be clothed with a significance which do not invest it when taught by a medical professor to a class of medical students. Is it said that anatomy is not so well and thoroughly taught in dental as in medical colleges? Then the fault is with the dental professor and not with his opportunities; for anatomy *can be*, and in some instances is, as thoroughly and efficiently taught in dental colleges by dentists as it is or can be in medical colleges. Anatomy taught by one proficient in dentistry, in addition to its general bearings, will have special features and points of importance to the student of dentistry, just as anatomy taught by medical professors should have its importance in general medicine and surgery.

What has been said of anatomy applies with even greater emphasis to physiology. The special matters of dental physiology of the greatest importance to dentists are not and cannot well be made the subject of teaching from a medical chair.

Chemistry is justly regarded one of the most important studies in the dental curriculum, requiring special application to the needs of dentistry; for through it perhaps more than any other means is investigation of cause and effect to be made. And yet so little

importance is conceived by general medicine to attach to this science for dentistry, that a recent announcement from one of the medico-dental colleges lays stress upon the point, in repeating it three times on one page, that DENTAL students will receive FINAL examinations in *Chemistry* and *Materia Medica* after but ONE course of lectures; and this with no other instruction in chemistry than such as is given to a *medical class* by a MEDICAL PROFESSOR. Surely this does not look like an appreciation of the needs of dentistry by the medical fraternity, neither does it seem to advance its educational status or enhance its general interests.

If we further compare the teachings of medical and dental professors in the departments of pathology, materia medica, and therapeutics, we shall find the contrast much greater and more unfavorable to education in dentistry in medical colleges than in the branches already referred to.

Medical writers,—themselves teachers,—apparently scorning to seek information from *dentists*, have exhibited lamentable ignorance of both *dental pathology* and *therapeutics*. We have no reason to suppose there has been any change in this regard.

Is it not, indeed, impossible that medical men should properly teach either dental pathology or therapeutics, *preparatory training* and *actual experience in dentistry* being an essential condition of such teaching?

Medical professors; even though they possess a knowledge of dental subjects, lecturing as they do to promiscuous classes, must give attention to the wants and necessities of the many rather than of the few; and the student of dentistry, sharing with the student of medicine, is compelled to select and appropriate such special information as may be suited to his needs. How many are able, unguided, to do this? *Not one*. The present advanced position of dentistry demands teachers educated in *this science* as well as in medicine, and no teacher is fully qualified to teach any department of the dental curriculum who is lacking in a practical knowledge of dentistry. Not until medical men shall have studied and practiced *dentistry* will they be qualified as instructors of dental students; and to give them positions as teachers, allowing them to pass upon the qualifications and grant degrees to students of dentistry does not seem the surest or the most efficient means for contributing to the advancement of dental education.

In what, then, lies the hope of dentistry? In contributing to the means and rallying to the support of those institutions which have done the educational work of dentistry. Dental colleges have made dentists to feel the need of education, and have advanced dentistry to its present honorable position.

Their work has taught the public the importance and value of educated service, a fact plainly exhibited in the enactment of laws for protection from charlatanism. Struggling with poverty and lacking in support, they have fairly earned for dentistry the professional status it occupies, and have made the holding of a degree a necessary condition of practice.

Shall, then, the educational work of dentistry be retained by those who have brought it to its present standard and whose interests are concerned in its progress, or shall it be committed to those who have *in it no interest*, and of it *no knowledge*?

### ESTHETIC DENTAL PROSTHESIS.

BY W. WARRINGTON EVANS, D.D.S., M.D., WASHINGTON, D. C.

(Continued from page 27.)

I PROPOSE in this number to devote myself principally to the causes of spaces between natural teeth. Dr. James W. White, in his little work entitled "The Mouth and the Teeth," page 41, says: "The teeth in man are arranged in close contact, without intervening spaces, affording each other mutual support after the manner of staves in a barrel. Being set without interspaces on a curved line, it follows that their outer surfaces are wider than the inner." If this is correct (and I assert that in ninety-nine cases out of a hundred it is), why should dentists and manufacturers persist in producing what is unnatural and disfiguring when correct models are so easily procured? If we are trying to imitate nature,—to restore natural expression,—why distort it? I used to condemn the manufacturers for the "picket-fence," sectional-block teeth; but I do so no longer. We are ourselves to blame. I see every

day beautifully-formed single teeth mounted in the same way by gentlemen claiming to stand at the head of the profession, from whom the manufacturers used to copy.

Fig. 23 is a front-view of a case designed to show the causes for interspaces, though not doing so in this particular cut. The teeth are full

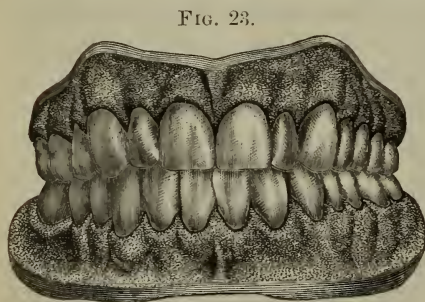


FIG. 23.

and rounded, presenting a pleasing effect. The laterals lapping over the centrals are broad, accounting, in part, for their irregularity.

Fig. 24 is a side-view of the same case. Here we have several



spaces developed through the loss of teeth above and below. In the superior maxilla the second bicuspid is absent, while the first and second molars have moved forward and the first bicuspid settled backward, adjusting themselves to easy occlusion, and nearly filling up the space left by the lost tooth, but at the same time creating new interspaces between the first bicuspid and cuspid, and first and second molars. The lateral is prevented from working backward by the inferior cuspid.

FIG. 24.



In the lower maxilla the first molar has been lost, the second has moved slightly forward, locking between the superior first and second molars, while the second inferior bicuspid has settled backward,—probably from the force of mastication,—occluding comfortably with the first superior bicuspid and molar, but leaving another space between the first and second inferior bicuspids. In this mouth we have both crowding and interspaces, and causes for both.

Fig. 25 illustrates another frequent cause of interspaces, namely, locking of the teeth through occlusion. We have in this case

FIG. 25.



nearly all the teeth bearing firmly against each other for support; and, as shown in the cut, almost a perfect occlusion from the cuspids back, though the point claiming our special attention is the interspaces on either side of the superior cuspid, which is slightly turned on its axis and is locked between the cusps of the cuspid and first bicuspid of the lower maxilla, precluding a possibility of its movement either forward or backward without artificial interference. The first superior bicuspid cannot come forward, owing to its nice occlusion with the first and second inferior bicuspid; the superior lateral cannot move backward, although crowded and overlapping the central, as it is forced forward and retained in position by the cusp of the inferior cuspid. So here again the interspaces are caused by malposition.

The present style of setting artificial teeth is found in nature as the result of amalgamation of races,—German and American, English and Eastern, American and Aboriginal. In such cases there is

likely to be an inequality of development between the upper and lower maxillaries,—one jaw partaking of the characteristics of the father, the other of the mother. The result generally is overcrowding or irregularity; but we sometimes find cases as shown in Fig. 26. Here is a well-developed inferior dental arch, with proportionately well-developed teeth, characteristic of one parent, while in the superior dental arch the teeth resemble those possessed by the other parent, and are too small in proportion to the size of the jaw. The result is interspaces between nearly all of the teeth in the superior dental arch.

Fig. 27 is a side-view, displaying these defects, the cusps of the

FIG. 26.

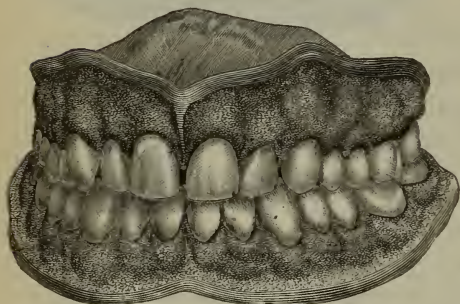


FIG. 27.



superior falling in between those of the inferior teeth. But I find that I am drifting away from my original intention, which was to illustrate by a few cuts how artificial teeth may be made to look comparatively natural under careful manipulation and a little study of the natural organs and of the human face. I shall try in some future paper to discuss the relative value of the different materials furnished us for base-plates, etc., the teeth best suited for individual cases, and a few words on common-sense, conscientious management of cases of irregularities; for it seems to me that there are almost as many teeth seriously damaged by improper appliances as are beautified and preserved.

I desire to mention that Figs. 10, 11, and 12, in the August (1880) number of the DENTAL COSMOS, described as two cases kindly loaned me by Dr. J. W. White, were made by Dr. Eben M. Flagg, of New York.

### SCREWS FOR ARTIFICIAL CROWNS.

BY EUGENE S. TALBOT, M.D., D.D.S.

THE main points to be desired in the application of artificial crowns are economy in construction, rapidity in manipulation, and durability, so that the poorer classes may receive the benefit and

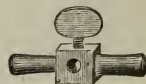
the operator a fair profit for his services. To retain artificial crowns in place it is essential that the retaining-screw should enter the pulp-canal a considerable distance, and be held securely, to prevent its becoming loosened by the constant strain in mastication. A proper screw-thread seems to supply all the requirements. The screw-thread which has been usually employed is so fine that when the screw is turned into the pulp-canal, the least strain upon the wire will strip either the thread upon the wire or that cut in the dentine. As a means of obviating this difficulty I have devised a thread unlike the customary forms as regards shape and number of threads to the inch. I employ three sizes of wire, represented by Nos. 17, 18, and 19, American wire-gauge. Nos. 17 and 18 are cut forty-eight threads to the inch, and No. 19 fifty-six threads to the inch. The thread is what mechanics term a cross, or "mongrel,"—it being partially old-style V and partially Whitworth's (English) standard. (Fig. 1.)

This style was adopted in order to retain the strength of the wire, and at the same time obtain a sharp thread which would cut into the dentine without the aid of a tap. A coarse thread is used, which may be quickly inserted and which will also take a good hold in the material in which it is imbedded. The wire to be used will depend upon the character of the crown to be attached and the manner in which it is to be retained in place. If the crown is to be attached after Dr. Bonwill's plan (with amalgam), platinum wire will be required. For ordinary use, gold wire will answer the purpose, and should be made from 14- to 18-karat, that it may be stiff. The root is prepared in the usual manner, using the reamers of my design in its preparation. In selecting the wire, the operator should be governed by the size of the canal and the hole or holes in the crown, although, in a majority of cases, either of the three sizes of wire may be used. The canal being tapering, the thread will take hold in some part of its length. When the root is ready to receive the crown, attach the wrench (Fig. 2) to the wire selected and insert it into the root, turning it until it will penetrate no further; remove the wrench and slip the crown over the screw, and fit it to place. The canal being tapering and largest at the opening, will allow the screw to be bent to the desired position. When the screw is located in its position, fill the balance of the canal with Hill's stopping (having first made an undercut when preparing the canal) and thus secure it firmly in position. Replace the crown and mark the wire the required length; cut off the wire at the place indicated, place amal-

FIG. 1.



FIG. 2.





gam or Hill's stopping in the root around the screw, and force the crown into place and finish with amalgam. Another method may be adopted, by grinding the crown to make a perfect joint, and, using sufficient Hill's stopping, warmed, force the crown into place and fill the space in the crown with gold. The thread and undercut in the crown will hold it securely. (Fig. 3.) A gold crown may be attached in the same manner, or, the wire being cut short enough to prevent its interfering with the crown when in place, by filling in with Hill's stopping or red gutta-percha. The wire will prevent the crown from tipping laterally. (Figs. 4, 5.) Or the ends of the wire may be bent. (Figs. 6, 7.) These coarse screws are particularly ad-

FIG. 3.



FIG. 4.



FIG. 5.



FIG. 6.



FIG. 7.



vantageous in cases where the teeth are decayed inside and filled with Hill's stopping or red gutta-percha. These fillings, being securely inserted, can be made a base for the retention of the screws, finishing with a crown.

## CLASPS AS FASTENINGS FOR ARTIFICIAL DENTURES.

BY J. W. CLOWES, D.D.S., NEW YORK.

THAN these, no items of professional practice have received more of my attention, and I am convinced, by long experience, of their entire reliability. Their sphere of usefulness, confined as they are to partial sets, is limited. Having a reputation as *harm-doers* in the past, I must needs be cautious in disclosing their excellence. To this end, the thing to be fastened as well as its fastening must be discussed; for a well-fitting plate and clasp must ever be united to attain success. *In my practice, narrow but doubled gold plates are used, composed of what may be called the base and stiffener. I employ two castings and two counters. The base and stiffener are separately struck up and swaged. They are placed together and swaged again. Joined by a fine solder, they are again swaged, and all this between the same casting and its counter. Annealing should always precede swaging. Having advanced thus far by means explained, I now bring forth my reserved casting and make*

the impress of the unchanged form upon my plate. My attention is next given to the *fitting* of clasps. Several important points are to be considered in this connection,—*a good hold is to be gained, damage to the natural teeth avoided, and ease secured in applying, wearing, and removing the plate.* These requisites are absent while the natural teeth retain their original form.

If the clasps surrounding the teeth merely touch the center of protuberance the hold is slight and unstable, while the liability to injure is greatly increased by retention of extraneous deposits. *Hence is shown the necessity for plain surfaces in the application of clasps.* Approximal sides of all teeth which I intend to clasp are carefully and skillfully flattened with the file. Toughness and elasticity are essential qualities of a good clasp, and they are obtained by the alloyment, in due proportion, of gold with platinum. When about to fit clasps I take the measure of the parts to be clasped with a piece of sheet-lead. This pattern enables me to approximate pretty nearly to the length and width which I desire, and prevents waste of material. The gold, having been cut according to its pattern, is rounded and smoothed on its edges, and when annealed, is ready to be bent and shaped for use.

*My clasp-fitting is done entirely with pliers upon the teeth as they stand in the mouth, and my reliance is never upon any form of them which may be gained by impressions in plaster or wax.*

The part of a clasp first to be fitted should turn the posterior buccal corner of the tooth, passing along its approximal and flattened side to wind around its lingual swell, thence straight across its anterior face to a point just short of ocular perception. *The turn at the place of beginning should be long enough to embrace the corner and enable the patient, by catching it with his finger-nail, to remove the plate from the mouth.* Clasps should never be allowed to irritate and inflame the gums.

Having adjusted the plate to the gums and the clasp to the teeth, our next effort must be to *connect them.* If we succeed in this without in any way impairing the excellence of the work already accomplished, we may indeed rejoice. *The plate fits and the clasps fit, but the momentous question is, will they fit when united?* I have seen the day when to be able, confidently, to say yes to this would have been manna to my soul! Groping in darkness, attended by defeat, is hard upon the constitution, and, looking back to my early days of professional trial, I confess to having often endured the rack from this very inability to *make two things fit when together just as well as when apart.*

With the plate and clasp in position, we proceed to take a *try-plate impression.* This may be obtained in plaster or wax. I prefer wax.

For this purpose, if I have taken the original impression in wax, it is preserved in the pan until needed. This impression should be softened with warm water, retaining a sufficiency thereof in the clasp-teeth walls to render them softer than the rest. Now insert the plastic wax; with the thumb and two fingers of each hand apply it; steady, now; exert no undue pressure on any one part, but firmly and evenly do the work. Withdraw it carefully and without rocking. *You have it now,—a try-plate impression, the very key, if you know how to use it, to ultimate success.*

With the impression in your hand, what next? Remove the plate and clasps from the mouth and restore them to their impressions in the wax,—but, softly,—the clasps first and after them the plate. But—softly, again—you must not attempt to replace the clasps in the wax until you have expanded them with the pliers to an easy fit upon the teeth,—*a fit so easy that you may put on and take off, and feel that it is without stricture and without friction.* With delicate tweezers lay them now—gently—in their waxy beds. *As they lie there, harmonious in relation, harmonious in place, you may well exclaim, beautiful! beautiful!!* Having filled up your impression with sand, plaster, and asbestos, and given an hour for setting, fasten your plate and clasps together with *hard* solder, and try them in the mouth. If you have been faithful to my directions you will know how much like true satisfaction a plate and clasps may be. With this achieved, pause not until the lost in nature is replaced by the restored in art, and the denture, once more complete, exists, a thing of use and beauty.

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#### SOME OF THE CAUSES OF LOSS OF THE TEETH IN THE ADULT.

BY CHAS. J. ESSIG, M.D., D.D.S., PHILADELPHIA, PA.

WHILE fully recognizing the honor of the somewhat formal notice which Dr. George A. Mills has given the paper read by me two years ago before the Pennsylvania State Dental Society, I regret that he has incorrectly quoted me, and criticised accordingly.

Since Dr. Mills felt it incumbent upon himself to prepare and read before the First District Dental Society of New York a reply to my paper, it would seem that accuracy should have been a prominent quality of his essay; but he incorrectly states both words and meaning in his reference to my description of “the <sup>\*</sup>precursory symptoms, in a case which I had the good fortune to watch for more than ten years” (page 578, DENTAL COSMOS for November, 1880); and I am at a loss to know just what he takes exception to in this connection, since we agree that “this first expression of the disease is the time for successful treatment.” This is clearly



expressed in my paper, pages 580, 581, and 582. I also stated that it was probable that the prodromic symptoms were frequently overlooked, but I am very far from agreeing with Dr. Mills that a "want of knowledge" of so simple a fact exists generally throughout the profession.

He states that "Prof. Essig seems to consider that the term Riggs's disease applies only to loosening of teeth by reason of caries of the alveolar investment." That is exactly my understanding of it, and I employed the term in the absence of a better one, under the impression that it specified a particular lesion, just as a physician would designate the peculiar renal disease productive of albuminuria as "Bright's disease." Dr. Mills's explanation of Dr. Riggs's claim, "that all phases of the disease in question are but different stages of the same trouble," would appear to mean that all phases of Riggs's disease are but different stages of Riggs's disease, or that Riggs's disease is Riggs's disease. This I shall not dispute; but if it is claimed that all causes of loosening are embraced under that head, then the term is without definiteness, and there remains nothing to recommend its perpetuation in the nomenclature of dental pathology; and it would be just as appropriate to call all renal trouble Bright's disease.

If thoroughness in the removal of the calcareous deposit in this lesion is of importance, then, for the reasons given by me (page 581, DENTAL COSMOS for November, 1880), I repeat that "I can conceive of no process of scraping the roots of teeth in the mouth which promises thoroughness." By instruments, backed with "ability all the way from A to Z," I do not believe it is practicable, except, perhaps, in the most simple cases. In this connection, my reference to aromatic sulphuric acid was to recommend its use as an adjunct to the instruments in the removal of the hard deposit, the scant layers of which I have found to be readily softened by that menstruum.

I have not seen Riggs's scalers employed by Dr. Mills, but I have seen cases which have been thus treated by "experts," and have heard reports of others without being in the least degree more favorably impressed regarding results.

The assertion that I had never seen a well-marked case of the disease in a person under years of maturity was true at the time my paper was read in 1879. Since then I am able to report a case in which the investments of the superior lateral incisors were thus affected. There had been no "eruptive fever," however. The roots were entirely free from any calcareous deposit, and there was a copious discharge of pus from sinuses extending the entire length of the roots. The patient was seventeen years of age. The appearance the disease so early in life is, however, exceedingly rare.

## A CARD FROM DR. W. FINLEY THOMPSON.

I CANNOT but feel that the criticisms made by Dr. Atkinson upon a case submitted to the New York Odontological Society, and reported in the December (1880) number of the DENTAL COSMOS, must have been prompted by a misconception of the treatment pursued.

It will be seen, by referring to my paper, that the *mechanical* bearings of the case were immediately recognized, and mechanical remedies applied to remove the exciting cause of trouble. I must beg to differ with Dr. Atkinson in his assertion that "There is nothing difficult about it," and, also, that "The testimony is so clear that it is either yes or no." I am still further confirmed in the belief that the doctor's impressions were erroneous, from the following: "He says the pulp was living when he extracted the tooth." I am compelled to ask Dr. Atkinson *when* or *where* this assertion was made. The tooth was not extracted until "a vigorous course of treatment . . . was uninterruptedly and faithfully pursued for a period extending over three months." The following may have misled the doctor:

"My diagnosis (of the condition, not of the cause) not being satisfactory, I resolved not to operate at once, but made another appointment. . . . At the second visit of the patient, October 13, the disease having concentrated itself upon the right superior central, I determined, first, to open the pulp-chamber, that treatment might be effected through the nerve-canal, in connection with remedies externally applied; and, second, to build up the teeth with gold until the original articulation was restored, in order to relieve the anterior teeth from pressure. The signs of disturbance led me to believe it a case of pulpitis, notwithstanding the indications of *vis vite* presented by the tooth itself. The pathognomonic symptoms of acute disease in its surroundings had deceived me; for, upon opening into the pulp-chamber, my diagnosis proved to be incorrect. However, my *exploration*, although executed under the guidance of mistaken impressions, was a cause for no lament, as all efforts to effect a cure by treatment in the mouth proved abortive, even when the medicinal remedies were directed to the seat of functional derangement *by injection through the apical foramen of the root.*"

The words italicized are wholly incompatible with any assumption that the pulp was alive when the tooth was extracted.

Dr. Atkinson says: "What inadequate conception must be in the mind of a man to say he would take the risk of drawing a tooth, the normal connections of which are healthy, for the sake of getting rid of a small portion at the end!" As a rebuttal to the implied meaning of this sentence, I would again quote from my paper:

"In regard to the indications as to when and under what circumstances treatment by replanting should be adopted, I can only say that I consider it a *dernier ressort*, and only justifiable when a tooth is so complicated with disease as to make other treatment doubtful, or, perhaps, extend over such a length of time, upon an uncertain hope, as to cause a quicker method to be more acceptable."

Again, the doctor says: "If he knew anything of the nutrient anatomy, and had the light, he would make a hole in the alveolus opposite the end of the root and amputate it, as has been done repeatedly." This leads me to believe that the doctor's mind must have been preoccupied at the time my paper was being read, for I distinctly stated that the tooth was suspended in pus, and that, instead of its being in a "normal" condition, it and its "connections" were as thoroughly abnormal as could well be imagined, the tooth having "assumed a pendulous mobilization\* which threatened entire expulsion." Now, if the doctor had observed the diagrams which illustrated my paper (he may yet examine them, if he choose, as they are still in the possession of the Odontological Society), he could not have failed to see depicted, in one diagram, at least, the blood supply or "nutrient anatomy" of the periosteum.

The doctor seems to overlook the fact that the paper was not to prove the superiority of the practice of replanting teeth, but to show a late instance. He also appears dissatisfied with the evidence of the demonstrated fact of success simply because it was not accomplished by a special means, which I most unhesitatingly pronounce contra-indicated in this case.

In apologizing for troubling you at so great a length, I admit that it is unusual to criticise a *critique*; but that course is admissible when theories or assertions are made at variance with the facts put forward.

W. FINLEY THOMPSON.

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## PROCEEDINGS OF DENTAL SOCIETIES.

### NEW YORK ODONTOLOGICAL SOCIETY.

REGULAR meeting held at the residence of Dr. W. H. Dwinelle, December 21, 1880.

President, Dr. W. A. Bronson, in the chair.

Dr. Law, Chicago. For three or four years I have been experimenting in the matter of inserting skeleton gold plates by what may be called water-tight bands attached to the natural teeth. The bands of gold are struck up so as to fit accurately around such

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\* Should read "mobility."—W. F. T.



of the natural teeth as are suited to give support to the narrow gold plate to which the artificial teeth are soldered. When placed in position the fixture is not to be removed by the patient.

I have some four or five hundred cases in actual service. The models I here exhibit will show how the work is done. I have also an illustration in my own mouth which I shall be glad to show; it is, however, one of my first efforts, and the work is imperfectly done.

Dr. N. W. Kingsley then read the following paper on "Some of the Comforts and some of the Torments of Modern Dental Chairs."

If any apology were needed for my taking up the time of the society with some remarks upon dental chairs, it would be found in the fact that we are each asking the other of his experience with dental chairs, and in rare cases are meeting with an answer of complete satisfaction; besides, I find I am not unlike others in the frequent reception of requests for information and advice about the chairs now in market.

We see testimonials *ad libitum* which bear every evidence that the writers felt complimented by being asked for their recommendation and in duty bound to say only complimentary things, withholding all reference to objectionable features. I know no reason why I should hesitate to express here publicly my honest convictions of the merits of the machinery for sale in the market, the same as if I am asked privately in my own office. I am under no obligation to any manufacturer which would require me to suppress any conviction which I deemed of service to my fellow-practitioners. My remarks will be upon principles involved and upon the intrinsic and relative merits and demerits of certain chairs, and for this purpose the makers, whoever they may be, are unknown to me.

If I could have known before my experience what I am about to tell, it would have saved me much time, much worry, and considerable money. The present effort, therefore, is to save others what I have gone through, and to permit them to begin where I left off. I do not intend to go into a description of all the devices which have been resorted to by ingenious mechanics to provide for the supposed wants of the dentist in an operating-chair. I say *supposed* wants advisedly, for I find a constant tendency to magnify the real wants and add a large number of imaginary ones, until the supposed or imaginary wants outnumber the real ones.

There are two classes of wants which have been recognized and extraordinary efforts made to satisfy them.

1st. The need of the patient.

2d. The requirements of the dentist.

The first, or need of the patient, has of late been very much magnified; many ingenious and complicated changes have been made for that sole purpose, and, looking at them as a whole, we are compelled to pronounce them as unnecessary or a failure.

What *are* the needs of the patient?

Are they such as demand machinery to supply?

Are not all the real needs of ninety-nine per cent. of the patients to be found without machinery or specially-made chairs?

The answer is found in our sitting-rooms and our drawing-rooms, which are filled with comfortable seats where we meet our friends and sit for hours without ever thinking of discomfort. The arm-chair, the reclining-chair, the rocking-chair, each and all supply all the needs of the patient, even if he were submitting to operations upon his teeth. The patient requires no more elaborate provision for his comfort while being operated upon than can be found in any well-furnished drawing-room in the land. If it were possible to have a chair so constructed that it could be made to fit the body of the patient when he first sat in it, it would be useless. You cannot fix the body as you would in a vise, no matter how comfortable at first. It will wriggle or twist about somewhat, and find its own place of rest. A cast-iron bed perfectly fitting the body would be, when first applied, as soft as down, but because it would not permit of change in position of the body, it would shortly prove the most painful torture.

Thus we see that complicated arrangements for the comfort of the patient are uncalled for, and in many cases have resulted in positive disadvantage.

This contradiction of the idea that either the comfort of the patient or the success of the dentist requires a specially-made chair is found also in the experience of more than one of the older practitioners now present, who have performed just as skillful operations while the patient was sitting in a common rocking-chair as they have ever done when surrounded by the most cunningly devised of modern apparatus.

I think, therefore, we may dismiss the idea that the patient's bodily comfort is anything which should give us anxious thoughts or need peculiar or complicated apparatus to meet it.

But our second branch of the subject—the needs of the dentist—cannot be disposed of so readily.

The primary object in a specially-made dental chair is: that the operator shall have such facilities as will enable him to do his work in the most skillful manner. Anything that will contribute to the success of the operation, or to the ease and comfort of the operator while performing it, is of paramount importance. That which will

contribute to *his* ability and *his* comfort must be regarded, even at the expense of some slight discomfort to the patient.

The patient is called upon to endure for an hour or two, with long intervals of rest. The dentist must continue hour after hour, through months, years, and a lifetime, and his energies must not be impaired by his being compelled to operate in a strained or cramped position, or by a false notion of the superior demands of the comfort of his patient. Whatever can be done by the aid of appliances that will conserve this energy must be adopted, even at some slight sacrifice of the patient's comfort, if necessary. Whatever experience has found in the modern dental chair which serves to impair this energy or nervous force must be discarded or avoided.

Time and patience devoted to the arrangement of curious and unique movements by the dentist in an operating-chair detract just so much from the thought and skill which should be devoted to the higher and more important operation.

Many of the modern chair inventions, while capable of producing excellent results, have done so only at the expense of time, annoyance, and strength out of all proportion to the benefit derived. To be of real benefit to the operator they would require a well-drilled mechanical engineer to run them. The mind which is concerned with the treatment of a vital organ must not be diverted by the effort to manage some difficult and annoying machinery. Machinery which requires for its results an arrest of the mind-current and a concentration of thought for its adjustment, which throws the nervous system out of its equilibrium in its efforts to manage it, will be the cause of more profanity and unskillful operations than we have yet conceived of. Machinery which does not move easily and at most automatically into a position of natural accommodation to its requirements is not only valueless, but positively detrimental. Machinery in a chair, to be helpful to a dentist, must have *limited* movement corresponding in some measure with the natural movements of the body.

It is no recommendation to a dental chair that it is adapted to a display of all the gyrations of a contortionist. You cannot place patients in an awkward, unnatural, and disagreeable position to themselves, no matter how convenient it may be for you, and expect them to remain so through a long operation; they will inevitably wriggle out of it.

The number of movements in a dental chair should be few, they should work easily, without the use of both hands, if possible, and so nearly automatically that they could be managed without giving them special or individual thought.

I have intimated that machinery, to be helpful, must move within



a limited range, and I do not hesitate to affirm in the most positive terms that the adoption of a mechanical contrivance in a dental chair which admits of great lateral movement, amounting almost to universal, is absolutely false in principle and should be utterly discarded. Ball-and-socket joints, or their equivalents, in a combination of movements are, without exception, the worst contrivances ever adopted by a chairmaker. I am convinced that much of the absurdity in mechanism which we now have to contend with never originated in the demand of any dentist, but has been gotten up as a kind of clap-trap to make the chair appear wonderful and give it a commercial value.

Dentists are like the rest of humanity, more than three-fourths of whom never reflect whether the means they are using is of all others best adapted to the end, and so, complicated and unnecessary machinery is made to sell, and the dentist uses up his nervous system in endeavoring to adapt himself to the chair instead of seeking something best adapted to his needs.

There is another consideration in the selection of a dental chair which is of secondary importance, but which, if other things were equal, would be sufficient, in my mind, to constitute a preference. A dental chair is not a surgical instrument; it is a piece of furniture, and there is no reason why it may not be made to look comfortable and inviting rather than forbidding and repulsive. The esthetic considerations are of no small moment in their influence upon the patient, and ought to be upon the dentist himself, and a dental chair that could hardly be distinguished from a lot of mowing-machines, if placed among them, has certainly small recommendation as a piece of furniture.

Of all the chairs which have claimed attention within the last few years, the Morrison chair marked the most important improvement. The one feature which distinguished it from all others up to that time, so far as I know, was the ability to elevate the patient bodily when seated. This feature in a chair, in one form or another, I regard as of more value than any other distinct feature in any modern chair. In the Morrison chair the importance of such a movement was fully demonstrated; yet the physical exertion of stooping down and turning a crank with a heavy person seated in the chair was, in some cases, so great as to overcome the advantage of its rapid movement. There were many other objections to the Morrison chair which it is hardly worth while now to notice, as it has been in a measure superseded by some later claimants to favor. In passing, however, it is as well to note that, esthetically considered, the Morrison chair had hardly a redeeming trait.

Its rivals, to which I shall now confine my remarks, are the

"Wilkerson" chair and the "White" chair, both of which can be elevated and depressed by the action of a pedal lever. That objection to the distinguishing feature of the Morrison chair is in both these chairs entirely removed, and the power to raise the patient by a simple movement of the foot makes such a device of incalculable value.

Whatever the comparative merits of these rivals, this one feature, common to both, will go very far in redeeming each of them from some glaring faults. I have worked over both of them, have listened to the complaints of patients, have analyzed the difficulties I have encountered, and I shall be able, I think, to make a just comparison of their claims for preference.

Beginning at the bottom, we find that the arrangement of the feet differs, in that one has the chief supporting-leg placed immediately behind, while in the other, the four legs and feet are placed as in ordinary chairs.

It is claimed for the Wilkerson chair, which has the one leg behind, that it has an advantage over the other in this respect: that the legs and feet of the White chair are in the way of the operator; but in my experience this is a mistake. I have never, in a single instance, found the legs of the White chair in my way, and can only conceive of their being in the way of very large feet.

The foot-rest in each chair is different. In the White chair it is shortened by turning a crank, to accommodate short-legged people; in the Wilkerson this want is provided for by a foot-movement. It is not likely that a majority of dentists would give any decided preference to one over the other. Personally, I have an antipathy to stooping down, adjusting a crank, and turning it, if it can be avoided; and as I find all needed accommodation in the Wilkerson foot-rest by a movement of my foot without stooping, I like that better. There is in the White chair an excessive provision for the accommodation of children, made by bringing the extreme end of the foot-rest over towards and nearly to the seat of the chair. At first thought one would be inclined to regard this as a valuable adjunct, but I have watched the action of children in their use of it as well as their action generally when sitting upon chairs or benches made for adults. I find that children do not care for a foot-rest as adults do. They will sit all day with their feet sticking straight out or partly curled up without fatigue, and if a bench or rest is placed for them, they will make use of it but for a few moments. It is hardly fair to say that such a provision detracts from the merits of the chair in any other sense than that it is unnecessary, and complicates the machinery.

We come now to a consideration of the pedal-lever movement for

elevating the chair, and it is hardly necessary for me to remark that it is unquestionably the most important invention ever introduced into a dentist's operating-chair. To be able by a slight movement of the foot to elevate or depress a patient bodily without change of position in the chair, and to do this without the slightest interruption to the progress of the most difficult operation, is such a luxury that no one but a dentist, nearly worn-out with fatigue, who has experienced the relief obtained in that way can fully appreciate it.

Time and again has the raising of patients in this way an inch or two or even half an inch, or again dropping them a like distance, brought such relief to my tired system that it was like infusing new life into me. No language of mine can commend this valuable invention too highly, as I cordially believe that it will prolong the comfort, health, and life of those using it.

In the two chairs the machinery for this elevation does not differ so much as to make any decided choice between them. The Wilkerson chair has the pedal lever at the right side, and jointed so that it is easily kicked aside. I have found no objection in practice to this method. The White chair has the pedal lever in the middle at the back, and without a joint. I found no objection to this until one day when I had rotated the chair so that I could get a better light in the left side of the mouth, I struck my shin-bone against this unyielding pedal and bruised myself considerably. Thereafter I was like the burnt child who dreaded the fire whenever I had the chair in the same position. With this exception I found not much difference in the elevating machinery, save that the White chair seemed to move with more ease. But in the action of the two chairs when they were let down there was a marked contrast,—a contrast which was radical and due to the difference in the arrangement of the machinery. The Wilkerson chair drops down by lifting or drawing towards you a pedal with your toe or the top of your foot. In order to do this the operator must balance himself upon one leg, and, if fatigued, steady himself by holding to the chair. I must confess that I have rarely been able, when there is a patient in the chair, to do this with such steadiness as to prevent a sudden slump to the chair, and it would drop more than I desired. In any event, I regard the principle by which this is managed as far inferior to the arrangement for a like purpose in the White chair. In the latter, the operator may stand, for example, upon his left leg, and with the right foot resting steadily upon the leg of the chair, his whole nervous system may be at ease, and, without steadying himself by holding to the chair, he can, in the most gentle manner, with the toe of the right foot, drop the chair as little and as easily as he may choose.



The next movement common to both these chairs is the tipping forward and back; it is not unlike in both, and is a plan infinitely to be preferred, when the operator wishes to drop the back of a patient, to having a joint at the bottom of the chair-back by which it can be let down. When the patient is tipped bodily back he becomes steadier and firmer in the seat the more the chair is tipped. When, however, the seat remains stationary and the chair-back is let down, there is a constant tendency on the part of the patient to slide forward and get away from the head-rest, thus altering the pose of the head. Both these chairs are well balanced, but there is a contrast in the methods of fastening. In the Wilkerson chair the catch is noiseless, and works with ease. In the White chair it works harder, and when it flies into place, produces a shock quite startling and annoying to a nervous person.

The rotation of the two chairs is not so dissimilar that I find any practical difference. This movement is to me a very valuable one.

The attachments of the spittoons differ. The arrangement on the Wilkerson chair is admirable; but my own convenience required that I should dispense with the operating-table arranged above it, as I found it in my way. The spittoon attached to the arm of each chair I found a bad arrangement, especially when I or an assistant wished to stand upon that side. The White chair has another spittoon-attachment similar to the Wilkerson, but it is not as good. The Wilkerson chair has an arrangement for tipping the chair laterally which the White has not. I do not regard this as of any advantage. I do not think an operator gains anything by tilting the patient over towards him. He cannot get any nearer the patient's mouth than the shoulder, besides it is an uncomfortable position for patients, and one which they are inclined to wriggle out of, and in the end the operator is better off to have worked with the body in the usual position.

I now call your attention to a peculiarity of the Wilkerson chair which I have never seen attempted elsewhere. It is a baby's seat. I can hardly call it a "child's" seat in the sense in which I think of babies as distinguished from older children. It is a baby's seat, because it will not accommodate the majority of children for whom we have to work, and will only accommodate infants with temporary teeth. On general principles, I doubt the propriety of making provision for the few extraordinary cases of infants that may require treatment. For the accommodation of very small children it has been my habit to put a cushion, big book, foot-bench, or any handy object in the seat of the ordinary operating-chair, and this I have found sufficient for the purpose. I have no objection to a special arrangement for infants, provided it does not interfere with the

convenience of the operator and the comfort of the large majority of patients. This arrangement in the Wilkerson chair I have found exceedingly annoying to the majority of patients, especially to ladies, who have almost universally complained of it. I can conceive of an arrangement of a chair-back which would make an infant's seat without interfering with the comfort of adults.

The White chair gives an illustration in its advertisements of an arrangement for a "half-grown child," which is certainly one of the most extraordinary shapes into which a chair could be put to work over.

All dentists who work with skill and ease stand much at the back of the chair; but I would almost as soon think of operating for a child who was sitting on one side of a threshing-machine and I on the other as to use this White chair when placed in this shape.

I regard the effort to produce an infant's seat in either of these chairs as having no other object than to give the chair commercial rather than practical value. The machinery of the backs of these two chairs shows movements of most dissimilar character. The movement in the Wilkerson chair is only up and down, loosened or fastened by the slight turning of a knob with one hand. It moves easily, and, in my own experience, has all the mobility that I think is ever needed in the back of a chair. The ease and facility with which it is controlled make it the best arrangement I have ever known. In striking contrast with this is the complicated machinery and movements of the White chair, with no less than four levers and rods standing out like so many stop-cocks on an engine. These levers have been the cause of many an annoyance to me, of which catching my watch-chain and jerking my watch from my pocket is only an illustration. I object to the movements in this back upon principle. The movements in themselves are well enough, but they are out of place and unnecessary. In the first place the back is jointed at the bottom so that it can be inclined, which I have shown before is a useless movement. Second, the lengthening of the back is accomplished by an almost universal joint,—that is, it cannot only be moved up and down, but it can be tipped, inclined, or wobbled anywhere. After considerable experience with this chair I found that it was better to set the back at a suitable angle in relation to the seat, and then let it remain. In elongating the back I was obliged to stand behind, use both hands, and exercise much care to be on my guard against displacing it. I am satisfied that the true principle which should govern dental chairmakers is the adoption of an angle or inclination which will accommodate the largest number of people. Such an inclination is not difficult to establish. It was discovered long ago by furniture-makers, and

there is not a well-furnished drawing-room in the land which does not contain one or more easy-chairs that fit comfortably every one who sits in them; and this ease and comfort is not due to upholstery, for the wood-seat and the cane-seat are, equally with the stuffed one, comfortable, if the shape is not at fault.

With all the praise I have accorded to the simple and ample movement of the Wilkerson chair-back, it is nevertheless so badly inclined as it is now made that it becomes a very uncomfortable seat. A change in the angle of the back would make all the difference between comfort and discomfort.

Lastly, we come to a consideration of the head-rest, which is really the most important feature of the chair. Unsuitable head-rests are now tormenting the dental profession more than any other appliance. You can practice dentistry successfully without a special chair if you only have a suitable head-rest, but you cannot succeed comfortably with the most elaborate chair without a convenient head-rest. An old rocking-chair, placed at the proper height and blocked up with sticks of fire-wood, with a suitable head-rest, is infinitely better than some of the chairs now in the market, with all their complicated machinery and capability of contortions.

The worst head-rest I ever used was the one on the Wilkerson chair, with ball-and-socket joint; and not much better is the one belonging to the White chair. One of the worst features common to both these head-rests is that you are obliged to stand behind the patient and use both hands to adjust it. That position which you are compelled to take, viz., behind the patient, prevents your seeing with exactness that pose of the head and direction of the mouth which will facilitate your work. Your arrangement of the head under those circumstances is mere guesswork, and, in a majority of cases, you have missed the mark at the first shot. You make the discovery when you begin work, and must then go to the rear, use both hands, take another aim, and make another shot, this time with better success, naturally, because you have now a definite object in view, which is to avoid doing what you did before. Even then, in nine cases out of ten, you will wish it a little different; but it is better to submit than run the risk of another trial. You will probably conclude that life is too short to spend any further time on the adjustment of that head-rest.

I think the Wilkerson head-rest is certainly, without any possible exception, the most tormenting thing a dentist was ever cursed with. It has no natural movement,—that is, it has no movement within limits to correspond with the natural movement of the head such as a dentist requires. The commonest as well as the most im-



portant movement of a patient's head required by the dentist is forward and backward. Very little besides this (except rolling the head in the rest) is ever really required, and yet this most common and simplest of all movements it is impossible to directly obtain with that head-rest. You cannot move it forward or backward on a direct line. If you attempt it ever so little you must use both hands, and then the head-rest will go on a zigzag, like a ship beating up against the wind. The claim that is advanced in its favor—that it admits of placing the head in a variety of peculiar positions—is its damaging feature. It is certainly easy enough to put a head in any position you never want, but almost impossible to put a head in any position you *do* want.

The White head-rest, while possessing less ability to revolve around (and in that respect superior), is still a very annoying thing to manage. It is open to nearly all the objections which have been argued against the other, together with another curious anomaly,—the hood or rest for the head is jointed at the middle instead of at its lower edge. It has no movement corresponding with the natural movement of the head upon the neck, so that that most frequent of all changes in the position of a head required by the dentist cannot be obtained with it without considerable effort in the re-arrangement of the machinery.

I worked for several weeks over each of these head-rests, in the vain effort to master their intricacies, and with the expectation that when I had learned to use them I should find them convenient, and that they would contribute to my comfort in operating, until at last I gave up in sheer despair, and set about adapting to one of these chairs a head-rest that I invented some three years ago.

At the time I originally made it I had remodeled an old Perkins chair, with a ball-and-socket joint, and had discarded some objectionable features,—among others the head-rest. My effort, then, was to make the most simple as well as the most effective head-rest possible, and in a study of head-rests I saw that they all had three distinct mechanical movements:

First, the perpendicular movement for spinal columns of different lengths.

Second, a horizontal forward movement to reach heads as they were differently set upon the shoulders, and

Third, to provide for the movement of the head upon the neck, forward or back, as might be required.

I found that some head-rests made provision for another movement, viz., for drawing the head laterally towards the operator. After much observation I came to the conclusion that this last movement was unnecessary; that the operator was misled if he sup-

posed he gained anything by such action; that in any event he could get no nearer the head of a patient than the shoulders; that he could do this without a lateral action of the head-rest; and that there was an abundance of opportunity to twist a head about in a head-rest which had no such lateral movement.

I believe that all that is ever required of the top of the head-rest is the simple provision for moving the head forward or back, and that this should be done by having the hood or dish for the reception of the head, hung by a simple joint at its extreme lower edge. My head-rest was made in this way, and was kept in any desired position by a curved ratchet and spring, which was worked readily with one hand.

The two other actions found in other head-rests, the perpendicular and the horizontal forward, I accomplished with but one mechanical movement, by making the perpendicular rod curved instead of straight.

In all cases the straight rod, when elevated, carries the head-rest away from the patient's head, and necessitates the horizontal movement, but, by studying the various shoulders of short and long people who sat in my chair, I was able to adopt a curve which would meet an universal want, so that one action of the hand is all that is required to bring the head-rest into position.

This head-rest was exhibited to the Odontological Society some two years since, and was much complimented, but I made no effort to put it in market.

As before remarked, in my annoyance arising from the use of the others described, I set about the adaptation of my head-rest to one of these chairs, and the result has more than equaled my expectations. What it may have possibly lacked in the Perkins chair, because that chair-back was stationary, is here provided for in the up and down movement of the Wilkerson chair-back, and I have no hesitation in saying that I believe that this head-rest, with that chair-back, makes the most effective, simple, and easily managed machinery for the purpose which has ever been produced. I have yet to see the patient, no matter how ill-shaped, short of gross deformity, with whom this back and head-rest will not move almost automatically to a position which will give him ease and comfort. The relief found in its use, after the annoyances of the others, is the peace which comes after a tormenting struggle.

#### *Discussion.*

Dr. O. E. Hill. If there was time I should be glad to have this matter of dental chairs fully discussed. A few of the points which I consider decidedly in favor of the White chair, and which, it seems

to me, Dr. Kingsley has not sufficiently emphasized, are these: First, the ease and rapidity with which it can be raised and lowered; certainly the act of lowering it is in every respect superior to that of the Wilkerson. Second, the seat is much more commodious and comfortable, and is inclined towards the back in such a manner as to lessen the tendency of the patient to slide forward; the arms are higher, and offer a better support, while the great range and adaptability of the foot-rest is a source of comfort to the ever-changing extremities. The next advantage is the swinging or adjustable back—the last and greatest improvement in dental chairs. For instance, in all long operations patients grow weary and change their position more or less, but you have then only to loosen the clamp holding the back to allow the patient, by slight pressure, to re-adjust it to any desired position. In this way you easily adapt the chair to the backs of your patients instead of compelling them to wriggle about in an effort to fit their backs to the chair. The head-rest can and ought to be improved, and I am assured it will be.

The President. I fear we shall have to defer further discussion of this subject at this time. Dr. Niles, of Boston, is with us this evening by special invitation, and the time for the reading of his paper is already past. Gentlemen, you are invited to listen to Dr. Niles.

(To be continued.)

## AMERICAN DENTAL ASSOCIATION—TWENTIETH ANNUAL SESSION.

(Concluded from page 43.)

### FOURTH DAY.—*Morning Session* (Continued.)

THE rules were suspended to allow the sections to re-organize. Following are the chairmen of the various sections:

SECTION I. Artificial Dentistry, Chemistry, and Metallurgy.—C. S. Stockton, Newark, N. J.

SECTION II. Dental Education.—Thos. Fillebrown, Portland, Me.

SECTION III. Dental Literature and Nomenclature.—W. H. Atkinson, New York City.

SECTION IV. Operative Dentistry.—M. H. Webb, Lancaster, Pa.

SECTION V. Anatomy, Physiology, Histology, Microscopy, and Etiology.—W. C. Barrett, Buffalo.

SECTION VI. Pathology, Therapeutics, and Materia Medica.—Frank M. Odell, New York City.

Dr. C. S. Stockton, Chairman of Section First,—Artificial Dentistry, Chemistry, and Metallurgy,—read the report, as follows:



Section First has no report on chemistry or metallurgy, but is pleased to record a growing interest in the department of artificial dentistry that is encouraging.

Dr. Kingsley, in his recent work on oral surgery, has called attention to the necessity of this department of our art assuming a higher position than is accorded it in our profession.

Articles have also been commenced in the DENTAL COSMOS upon this subject which promise much in awakening an increased interest in this department. While the older methods of work have undergone no great change during the past year, we report improvement in the working of celluloid that renders this base more certain in its results. The improvement is the perfection of the new mode celluloid machines invented by Dr. Campbell, by which the celluloid undergoes a process of curing while the plate is being pressed, the material thereby being made much harder and much less liable to discolor or warp while being worn.

In the manufacture of teeth there is a decided improvement in the forms of the bicuspid and molars, some of the manufacturers having the courage to attempt the introduction of the *natural* forms of these teeth, though the best of these attempts leave much to be desired. The first superior bicuspid is still smaller than the second; such arrangement is contrary to nature. The cuspid is also manufactured of the same shade as the rest of the denture, instead of being yellower, as nature makes them.

As many are advanced in years who require our services in this department, we would suggest the manufacture of teeth that will represent the effect of *wear* upon the cutting and grinding surfaces, and exhibit the effect of use often noticed upon these surfaces. There are at present no such teeth to be obtained in the dental depots, so that in partial cases we have only recourse to means that will glaringly exhibit the artificiality of our work upon the slightest exposure. A change in these respects is earnestly recommended.

We would also call your attention to the new metallic base,—“Reese’s Gold Alloy.” This is a cast base, and promises much in the way of accuracy of fit and a better health of the mouth.

With every encouragement to continued advancement in this department of Section I., this brief report is respectfully submitted.

Dr. Eben M. Flagg, New York, read a paper on “Dental Art,” of which the following is a synopsis:

There is an element which enters into the conception and execution of every branch of our labor, and more or less forms part of every operation that we are called upon to make, be it surgical, operative, or prosthetic. This element, the element of art, wherever it enters the field of human life, has for its function to finish and render

attractive the hard labor that preceded it. Thus we do not find it in its full manifestation, except in those departments of labor which have attained scientific certainty.

We find that the necessity for art in dentistry exists in proportion to the hopelessness of the case. The greater the amount of lost tissue to be replaced, the greater the knowledge of *natural* form required to properly effect its replacement. Beginning with the restoration of portions of teeth through gold fillings, we come to the loss of the entire crown, and, finally, to that last resort, the replacement of the entire denture. Knowledge of form and color, of expression, character, and effect, now becomes imperative to the dentist. To relieve the condition of his patient, the arts of the sculptor and colorist must be studied with more care than many of us are wont to give them, while a knowledge of temperament and physiognomy becomes an important element in our work. The patient, through the loss of his teeth, has not only suffered himself, but a wrong has been perpetrated on his fellow-beings through broken natural law, and he must not be permitted to give pain to others through the exhibition of a hideous deformity; for it is not *vanity*, but a duty we owe our fellow-beings that we look as well as possible; and we, as dentists, who have been obliged to study *physiology* that we might understand *pathology*, must now study beauty to avoid ugliness, and nature that we may avoid what is unnatural.

The only way in which we *can* study nature with satisfaction is to court her with such earnestness that she will bestow upon us her favors and make known unto us her hidden parts. We should copy and reproduce her healthful forms as do men in any other department of art, and keep them carefully in our laboratories for reference and study. If an irregular denture is to be made straight, there is often no greater help to that end than a model taken from a plaster impression of a regular denture of corresponding age and size. A study of this model will often in one moment give a better idea of the changes required in the malpositioned denture than hours of unaided exercise of the imagination.

If a complete denture is to be made, another model, taken from a plaster impression of a complete set of natural teeth in the mouth of a patient of corresponding age and temperament, will lighten our task and prove to us an invaluable guide. These models are not very difficult to obtain. Often a lady patient will feel complimented at being asked to give a sitting for an impression of her perfect mouth, if it be asked in the right manner and she knows it is to be used in the interests of science, and to assist in relieving her more unfortunate fellow-beings.

It has been my plan, after taking impressions for study, to label

each model with a description of the person it represents. The temperament, age, sex, and color of hair and eyes are noted, and two porcelain teeth selected to accompany the case, one to correspond with the color of the canine tooth and the other the remainder of the teeth on the model. It is sometimes a good plan to paint the incisors and canines of the plaster model, so that their relative colors may be seen, and I have found these models useful not only in regulating teeth and constructing artificial dentures, but also in shaping contour fillings where the rubber dam conceals corresponding teeth, and where we cannot turn the patient's head in such a manner as to get the shape of the tooth from different points of view, so readily as we can a plaster model. If students will commence the study of their art by carefully collecting models from plaster impressions, the education obtained from studying them would never permit the acceptance of the China-ware for which (and I say it with regret) a demand has been established at the dental depots.

With the study of our art from natural models, we could never allow ourselves to make the first superior bicuspidati smaller than the second, and the cuspidati of the same shade as the rest of the denture; we would not make the standard of excellence in a dental substitute a question of how evenly the cusps of the teeth would sit upon a flat board; we would not permit ourselves to use molded gum-sections which make our patients' mouths look pretty much alike, varying only a little more or less in different degrees of ghastliness.

I sometimes think that our art could receive no better impetus than would be followed by the sudden destruction of every gum-section in the country; for then the profession would be compelled to furnish their own ideas on expression to their patients, while now, in consequence of inactivity in that direction, there has been great danger that if the present system of gum-sections continued they would have no ideas to furnish. It may be well to add, while we are on this subject, that I have already known in New York City, of dentists leading their patients to the depots and there allowing the patients to select from the trays the set of teeth that they most fancied, just as they would select a bonnet or a pair of boots.

Much has been said about the effect of rubber to bring dental art to its present degraded position. A paper like this is not the place in which to discuss various materials. That belongs more to the mechanical than the artistic department of our work, and art is too broad a subject to be ridden by hobbies or pet theories; still, it is only due in justice to say that through the process by which rubber is worked, it must produce a detrimental effect upon the advancement of anything artistic. The model is destroyed by the process of



boiling that it undergoes in the vulcanizer, and all opportunity of future study of the case is thereby lost, and the lack of this opportunity for study very soon begets a lesser desire for study, so that men who are students are prone to turn away from a subject where ideality is likely to receive so little remuneration. But this subject is so vast, that in a paper like the present one must be content to merely call attention to the necessity of reconsidering a department that has long lain neglected, and whose neglect has degraded the profession as artists in the eyes of an intelligent public, without doing away with *their* necessity for a department of art whose requirements are but miserably fulfilled.

The selection of the next place of meeting, election of officers (the result of which has already been reported in the DENTAL COSMOS), and other routine business followed, among which was the announcement of the following committee on the feasibility of holding an International Dental Congress: Drs. Taft, Peirce, Cushing, Bronson, and McKellops. Drs. Shepard and McManus were subsequently added to the committee.

The committee appointed to draft resolutions respecting the death of Dr. H. L. Sage reported the following, which were unanimously adopted:

It having pleased an all-wise Providence to call from the scene of his earthly labors and usefulness our esteemed brother, Dr. H. L. Sage, of Bridgeport, Connecticut, therefore

*Resolved*, That with deep regret the American Dental Association has learned of his decease.

*Resolved*, That in the death of Dr. Sage the association has sustained the loss of one of its most zealous members, and the community an excellent and useful citizen.

*Resolved*, That we accord to his memory a heartfelt tribute of respect, and tender to his surviving family our condolence and sympathy in their heavy bereavement.

*Resolved*, That the secretary be requested to send a copy of these resolutions to the family of the deceased.

The committee appointed to prepare resolutions respecting the death of Dr. Samuel S. White made the following report:

He is not here in bodily presence, but he is here in the spirit and effect of the work he accomplished here in the flesh. We miss him for the first time at this our annual coming together in sweet accord of fellowship. It is therefore fitting that we should record here and now a sense of *our great loss* inflicted upon us by his advancement to better spheres and higher activities. He was with us from the beginning of our organization, THE man of most potency in holding us together for the good of the whole, by kindly consideration and justice of treatment of each individual as necessary to the efficiency of all in the exercise of the duty of each to other. He was a man of quick apprehension, quiet demeanor, and of moral grandeur excelled by none.

It is but recording the sentiments he entertained to say that the excellency he maintained among us was the result of the daily consciousness of an Overruling Power among men, obedience to whose behests ever brings the highest success in all the activities of earthly existence. He was our best example of the comprehension and practice of "The Gospel of Commerce."

Overworked in mind, body, and affections, he has been cut off in the midst of a pre-eminent useful career, and we submit to that dispensation which we have not the strength to acquiesce in, of which strength he was so full by reason of his devotion of all his energies to his ideal source of all Power.

*Resolved*, That a memorial page in our Transactions be set apart for this.

Dr. Morgan. It is proper on occasions like this that we should halt in the busy whirl of life and pay a tribute of respect to the memory of him who has gone from among us to return no more, and to take to our hearts anew the truth, the solemn truth, of the mortality of our bodies.

Samuel Stockton White was a prince among men; but he is gone, and we shall never again clasp his generous hand or meet his kindly greeting in our annual convocations. No one was more thoroughly identified with this association, or more ardently desired its success than he; and now that we shall never again listen to his wise and friendly counsel, we realize that indeed a prince in our Israel has fallen.

My business acquaintance with him commenced in 1847, my personal acquaintance and friendship in 1858, when I first met him. I think I came to know him thoroughly, and I honored and loved him well.

Dr. White's most striking traits of character were founded upon and grew out of his abiding faith in the wisdom and goodness of an overruling power. Deep down in his nature he had an unwavering trust (as he expressed it to me) in, and daily communion with, a Heavenly Father.

In early life he studied and practiced dentistry, and he became thoroughly identified with it, both as a science and an art, more and more while life lasted. After he ceased to practice and embarked in business he contributed to its wonderful progress more than any man of his day or time, especially in the way of improving and furnishing improved materials and fixtures for its practical details. His love of dentistry as a profession was exhibited to some extent in the many large and generous sacrifices he made to promote its interests; often at a heavy outlay of money, known only to a few of his personal friends, he purchased patents and appliances and quietly laid them aside, because he knew they would not be a benefit, but an injury to the profession, if made and sold. In this and other ways he spent thousands of dollars, of which he rarely spoke, and then only to intimate friends.

He possessed a self-command, I think, superior to that of any man I have ever known. When bitterly and unjustly assailed once, in my presence,—and it seemed that any man of proper self-respect would have resented it by violent means,—he with dignity forbore, and when asked how he could stand that, he calmly replied, “That man does not know me; he is mistaken in my character, and I can afford to wait until he discovers his error.” And the result vindicated his wisdom. Others might, and many would, under such provocation, have taken vengeance into their own hands; but this man, in his moral grandeur, wrapping his mantle of greatness around him, could say, “I can afford to wait!”

Let us cherish his virtues, imitate his noble example, that we may, as he did, have daily communion with our Heavenly Father while here on earth, and when we go hence, as go we must, we may, like him, have a home with the blessed and good.

Dr. Barrett. *Mr. President*,—I desire to express my hearty concurrence in the words of fitting eulogy so tenderly spoken by Dr. Morgan. A name exhaling sweeter fragrance was never left the legacy of family and friends; and if with us, who had but professional and business relations with S. S. White, that perfume lingers yet, and the air even now seems hallowed by an angel presence, how dear must be that memory to those who were bound to him by stronger ties and who walked continually in the light of his uprightness! If to us the remembrances of his presence are stimuli to nobler lives, what must his example be to those who stood continually near his side! “The memory of the just is blessed.”

The newly-elected officers were then installed, and the President announced the Local Committee of Arrangements and the Publication Committee, whose names have been already reported in the DENTAL COSMOS.

The following notices of proposed amendments to the Constitution were presented:

By Dr. Priest.

To add to Section 5, Article III., of the constitution, under the head of “Permanent Members,” that after the resignation of a member has been accepted, the association may at any time thereafter re-instate such member by unanimous consent.

By Dr. Dean.

To amend Section 1, Article VI., of the constitution so that the first sentence shall read, “To prepare, arrange, and expedite business, this association shall be divided into *seven* sections, as follows:”

And to change Section 5 to Anatomy, Histology, and Microscopy.

And to add Section 7,—Physiology and Etiology.

Adjourned to meet in New York the first Tuesday in August, 1881.



## PENNSYLVANIA STATE DENTAL SOCIETY—TWELFTH ANNUAL SESSION.

After the reading of Dr. D. D. Smith's paper on "Dental Education,"\* the following discussion ensued:

Dr. Essig. Dental education is a subject which should be presented in a broad and impartial manner. The essay just read is, in my judgment, illogical, and contains some misleading statements. Many might infer, from the allusion to the "office of dentistry," that a medical education is of no value to the dental practitioner, and that special skill, without general knowledge, is, in the opinion of the essayist, all that is required for the dentist; but if this be so, why use the term "profession?" Why not speak of dentistry as a trade? for surely if mere finger-skill constitutes the dentist, we need not be particular as to which nomination our specialty receives.

It may be true that there was a time when "the great science of medicine and surgery failed to comprehend and refused to make provision for the study of the treatment of the teeth;" and it may be equally true, that "respectable and medically-educated dentists were refused admittance to a 'medical' association," but what does that prove? If it proves anything, it is simply that the medical association referred to failed to comprehend the importance which attaches to the care of the teeth, and it does not in any sense negatively settle the question as to whether dentistry is a specialty of medicine. The history of dentistry is not unlike that of general surgery. There was also a time when the surgeons of London applied to the medical profession for recognition, and prayed that provision might be made for teaching their branch of the healing art. They were refused. Subsequently, however, the medical profession made advances to the surgeons, when the latter declined the honor, and an act of Parliament compelled them to come to terms, and surgery became a recognized branch of medicine.

No one denies that good work has been performed by the dental colleges; but a great many do question whether, with their present organizations and equipments, they can afford the coming dentist the educational opportunities which the dentistry of another generation will require. Is it likely that while every other science, art, and industry hurries on in the march of improvement, dental education will lag behind? It may be said that the dental colleges can and will come up to the required standard. If they can, well and good,—that is all that is asked of them; but with their present organizations this would seem hardly possible.

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\* See page 117, current number DENTAL COSMOS.

Those who are familiar with the past and present history of dentistry will not wonder that the medical profession failed, in 1839, to "comprehend" us, while now it extends the hand of fellowship. The history of dentistry is very much the same as that of other professions,—it had to make a beginning, found colleges, create a literature, etc., and, what is not very remarkable, it had to do this itself for itself. I do not believe that the progress of dentistry would have been less rapid had it been taught in the beginning as a specialty of medicine. Indeed, the wonderful progress made by ophthalmology, which has always been taught as such, may be accepted as evidence to the contrary.

The essayist truly states that medicine and dentistry have the same object in view, and while their methods are different, the end is "the relief of suffering;" but I am at a loss to understand how dentistry can be taught as "medical training with special reference to the oral cavity," if the idea of exclusiveness advanced by this paper should be practiced.

We are asked, How and by whom shall the work of teaching dentistry be performed? Do we not find the answer in the fact that there is probably not a dental college in the country whose faculty is composed entirely of dentists? Why is it that the chairs of chemistry, physiology, and anatomy in the dental colleges are nearly always filled by medical practitioners? Is this a necessity, and if so, is it not a strong argument in favor of the university plan of teaching? I know of no dentist actively engaged in practice who is capable of teaching chemistry, and the same may also be said of anatomy and physiology. The routine duties of the practicing dentist are absolutely incompatible with the acquirement of adequate proficiency in these branches. The universities have likewise recognized that the daily duties of the medical practitioner form an obstacle to his fitness for teaching these branches, hence some of them make it a provision that the incumbent of the chairs named shall not be engaged in active practice. In view of these facts, the question naturally arises whether it is not better to have dentistry taught in connection with the medical departments of the great universities of the country.

If it is true, as the paper states, that medical institutions, teachers, journals, and graduates have for years exhibited for dentistry and its practitioners "a contempt ill-disguised and unwarrantable," it may be assumed that the presence of medical men as members of dental college faculties must result in harm to the cause of dental education; for in those institutions, or in those of them with which I am acquainted, the faculties are the potential bodies in the entire management, educational and financial. Such being the case, is

it to be expected that the medical portions of the faculties, whose interests in those institutions are merely pecuniary, will encourage any progressive movements in the direction of higher standards, which may tend to lessen their dividends? The same objection cannot be urged against the university plan of organization, because the professors of chemistry, physiology, and anatomy, and all other branches, are appointed by the board of trustees, which is the governing body; they receive salaries which are either endowed or guaranteed, hence it does not affect their interests whether the number of students be great or small.

Reference has been made to the comparative "facilities for teaching, museums, surroundings," etc. I have only to say that the essayist does not appear to be well-informed on that part of the subject.

I fully agree with the statement of the paper that chemistry is one of the most important of studies, and I have always believed that its application to the metals should form part of the dental curriculum. This, however, could hardly be expected from the chair of general chemistry. I have never thought that a mere repetition each year of the same lectures was the correct way to teach an experimental science, such as chemistry, with any degree of thoroughness; and I am gratified to notice that the dental departments of the universities now require not only attendance on lectures, but a large amount of analytical work, aggregating more hours devoted to this branch than have heretofore been exacted of the dental student.

The essayist assumes that the branches of chemistry, physiology, and anatomy are not taught in the so-called medico-dental schools with any reference to the wants of the dental students. Such an assumption is unauthorized and without foundation; but there is much said about "dental chemistry, physiology," etc., which is mere idle talk. Before a man can be taught any special application of chemistry (for example, metallurgy), he must acquire a knowledge of general chemistry. If he succeeds in doing this, and is capable of thinking, he will have but little difficulty in applying it to his professional work.

Dr. Litch. The position assumed by the essayist that dentistry is, and must be, a separate and distinct calling rather than a specialty in medicine, is one to which I take exception. There can be no reason why this should be true of dentistry more than of ophthalmology, for example; both deal with special operations on special organs, and require special training for that purpose; but the knowledge of neither should be limited simply to manipulative skill. Specialists should be able not only to operate, but to precede or follow up their operations with local as well as constitutional treatment, when such is necessary. To do this effectively requires a



thorough knowledge of the principles of general medicine. From this stand-point it is impossible to draw a line beyond which knowledge on the part of the dentist is unnecessary. The dentist can easily know too little; he can hardly know too much about medicine. It is true, as stated by the essayist, that his office is not to assist women in cases of child-birth; but, certainly, if he is to take intelligent charge of the teeth of his patient, he should know the influence which the gravid condition exercises upon those organs, and, reciprocally, the influence which their disorders may exercise on the gravid condition, as well as their possible influence on all other functions and organic processes. To this end general physiology, as well as dental physiology, is undoubtedly a necessary part of his training. As to the question whether dentists can be best trained in separate dental schools or in schools associated with medical colleges, the position of the essayist is in the main correct. As at present constituted, the courses in anatomy, physiology, chemistry, and the materia medica in medical schools are entirely unadapted to the needs of the dentist, simply because, in all these branches the structure, function, composition, and diseases of these organs are almost entirely ignored. The essayist has well said that a dental atmosphere is lacking in medical colleges. While too profoundly convinced of the necessity for dental education to criticise in an unfriendly spirit any sincere effort to promote that end, the old law must be borne in mind, "put not the child to the nurse that cares not for it," and the fact cannot be denied that the medical profession, as a profession, cares not for dentistry. It is a pleasure to recognize the fact that this is not true of many individual members of that profession, and that a distinct advance in rational thinking on this subject may be recognized as pretty general among physicians the world over. But, until the medical profession acknowledge the claims of dentistry to professional recognition in a manner less open to criticism than the mere establishment of addenda or feeders to their own institutions of learning; until they give recognition to the importance of dentistry, by incorporating at least its elementary principles into their own curriculum; until they recognize the professional standing of dentists, by ceasing to bar out from their associations even medically-educated men who choose to make dentistry their specialty,—a distinction especially invidious since other specialists are freely admitted,—until these evidences of right thinking and right acting are fully made manifest, dentistry would do well to hesitate before committing her destinies to alien hands, and closing those institutions of learning founded by those who honored and loved the profession and unselfishly labored for its advancement; institutions to which all that is best in the progress

of the past can be distinctly traced, and from which all that is best in the progress of the future must surely come.

The President. How much additional time is required of students who have had no preparatory course in an office. I believe it is the practice of colleges to take those who have had no preceptor, or other advantages of instruction. What additional time is required in such cases?

Dr. Peirce. I think the dental schools and medical schools have made an advance where a preliminary examination is required. I think the institution of Michigan, and several others, require that preliminary examinations be had, and have for the last two or three years, and questions are prepared with reference to the student's knowledge of English branches. The spring and fall courses of instruction given by the dental schools is quite equal if not superior to the training received from a private preceptor.

Dr. Gerhart. I have been very glad that you have brought up this question of education. You all know what my position is on preliminary education; that we should come to the point of refusing every man who applies for a place as a student, unless he have a college education, or its equivalent. I think it is time to decline all students who are not educated men.

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#### THE DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE attention of the dental profession is called to the following special offer of *forty dollars* in cash as a prize for the best practical paper upon "Improvements in Dental Practice since July 1, 1868," subject to the following conditions:

1. Any dentist residing in the United States, and of good repute, may compete.
2. All essays must be submitted to the Committee on Prize Essays (W. A. Bronson, Chairman, No. 8 East Thirty-Fourth Street, New York) on or before the first day of May next.
3. The name of the author must accompany each paper in a sealed envelope.
4. The successful competitor must be present at the next annual meeting and read his production, which shall then become the sole property of the society.
5. The committee have full authority to discard all papers if none are presented worthy of the prize, or within the scope of the subject proposed.

The next annual meeting of the society will be held in the city of Albany, on Wednesday, May 11, 1881.

S. A. FREEMAN, *Secretary*.

## EDITORIAL.

## DENTAL EDUCATION IN GERMANY.

GERMAN dentists have for a long time been naturally anxious to have established institutions for the thorough teaching of the science of dentistry. As everything in the educational line in that country comes under governmental supervision, efforts have been made to secure the consent of the authorities to add this teaching to that of the medical departments of the various universities. This scheme has, so far, failed, notwithstanding it has had the earnest interest and co-operation of many connected with the different faculties, especially that of Leipzig. It is a matter of regret that this has not been done; but we are glad to see a re-awakening to the subject. The Central Society of German Dentists, at their next meeting, in Heidelberg, propose to discuss the subject of founding an institute in Berlin. A correspondent of the *Deutsche Viertel-jahreschrift für Zahnheilkunde*, in indorsing this plan, suggests the following names as lecturers: Microscopic anatomy and pathology of the teeth, Dr. Baume; dental operations, filling, extracting, etc., Dr. C. Grohnwald; dental metallurgy and preparation of mouth, C. Lauer; treatment of defective gums, Dr. G. v. Walther; mechanical dentistry, Ad. Winther.

It is to be hoped that the Central Society may overcome all difficulties in the way and establish this institute. The names suggested by the correspondent are eminent in their special departments; but there is no lack of capable material there to lead in this movement.

The serio-comic story that comes to us from the Vienna journals (see "Periscope") seems to have awakened renewed interest in the proper education of dentists in that country. The *Berlin Tribune*, in an article commenting on this Vienna case, makes the following remark: "Dentistry forms part of surgery, and this is willingly acknowledged by medical scientists, but requires a higher grade of manual skill than most surgical operations." The truth of this cannot be controverted, and we are glad to notice that the fact is coming to be recognized outside of those directly interested, for public sentiment has power in Germany as elsewhere.

## TO WHOM IT MAY CONCERN.

WE are receiving by every mail letters which have been received by our correspondents and forwarded to us by them. These letters are accompanied by documents, which, with a copy of one of the letters (a sample of all), we append. We thus give the enterprising



faculty of the Wisconsin Dental College an advertisement without charge which no amount of money could have secured a place in our advertising pages. Comment on the institution and the men engaged in it is unnecessary; and equally unnecessary, it would seem, is comment upon the fools who hope to obtain advantage by the possession of a diploma of the Wisconsin Dental College.

"DELAVAN, WIS., January 8, 1881.

"DR.....

"DEAR SIR,—By mail I send you the Wisconsin Dental College announcement. Should you conclude to take a full or part of the term, we will give you practical instructions which will be to your advantage. However, if you do not desire a college course, I take the liberty to make you this offer. Fill the blanks in the inclosed printed statement and return. If satisfactory to the faculty, will send you, in a cylinder box, by express, C. O. D., \$12.00, an elegant *honorary* diploma and degree, D.D.S. (Doctor of Dental Surgery), with your name artistically hand-printed. This diploma is twenty-two by seventeen inches, elaborately engraved on *parchment*, with signatures of the faculty and college seal. Should you accept of this compliment from the Wisconsin Dental College, we shall expect your influence by way of assisting to students in the future.

"Respectfully, your servant,

"DR. GEORGE MORRISON, *President.*"

The "statement" alluded to above is as follows:

".....188

"This statement is made to the faculty of the Wisconsin Dental College, located at Delavan, Walworth County, Wisconsin, for the purpose of procuring an honorary diploma and degree, D.D.S. (Doctor of Dental Surgery).

"I am a regular practicing dentist.

"I am a resident of..... Age,.....years. Have practiced dentistry.....years.

"Signature.....

"Witness....."

With the letter is also inclosed a circular, of which the following is a copy:

"WISCONSIN DENTAL COLLEGE, DELAVAN, WALWORTH CO., WISCONSIN.

"WINTER SESSION, 1880-81.

"*Faculty.*—D. B. Devendorf, M.D., Professor of Anatomy and Surgery; Dr. John Morrison, Professor of Operative Dentistry; Dr. George Morrison, Professor of Mechanical Dentistry.

"In the work of the college the faculty will be assisted, as occasion may require, by other dentists, residents of Wisconsin.

"Students admitted at any time during the session.

"This college is a regular organized corporation under the laws of Wisconsin, and will be conducted with ability and integrity.

"The requirements for graduation relating to age and to practical demonstration of skill at the operating-chair and in the laboratory are the same that are usually demanded by all reputable dental schools, except in this institution

students receive diplomas and degree D.D.S. for what they know and can do, and not for the number of terms spent at the college.

"The winter term of the Wisconsin Dental College will begin December 13, 1880, and continue till April following.

"The faculty (with one exception) is composed of dentists in actual practice, having an established business, thus being enabled to give the student the advantages of a regular office practice.

"Practitioners who wish to attend a part *only* of a term can do so by the payment of a corresponding portion of the fee.

"*Fees.*—Matriculation, \$5.00; tickets for one term, \$60.00; diploma, \$25.00.

"For additional information, address

"DR. GEO. MORRISON, *President*, Delavan, Wis."

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## BIBLIOGRAPHICAL.

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JOHN HUNTER AND HIS PUPILS. By S. D. GROSS, M.D., LL.D., D.C.L. Oxon., LL.D. Cantab. Philadelphia: Presley Blakiston, 1881.

This interesting memoir is a careful, intelligent, and detailed account of the life and services of the "man who laid the foundation of scientific surgery, and whose name is indelibly associated with the progress not only of his own profession, but with that of histology, physiology, and comparative anatomy." The author evinces throughout the book not only a profound respect and admiration for the genius, attainments, and skill of the subject of his sketch, but a warm affection for the character of the man.

To the memoir are added brief sketches of Hunter's more distinguished pupils and of several of his English cotemporaries. A portrait of Hunter heads the volume, and an Appendix gives a chronological list of his writings.

HAND-BOOK OF URINARY ANALYSIS, CHEMICAL AND MICROSCOPICAL.

For the use of Physicians, Medical Students, and Clinical Assistants. By FRANK M. DEEMS, M.D., Laboratory Instructor in the Medical Department of the University of New York, etc. New York: Industrial Publication Co., 1880.

This little manual is a concise guide for the systematic examination of urine, urinary deposits, and calculi, both chemically and microscopically. As a work-table companion its small size and tabulated arrangement make it convenient for reference. The author has managed to compress a great deal of information into a very small compass.

## OBITUARY.

DR. J. C. DUELL.

DIED, in Schenectady, N. Y., on Saturday, January 29, 1881, Dr. J. C. DUELL, in the sixty-fifth year of his age.

DR. DUELL commenced the practice of dentistry in Johnstown, N. Y., removed from that place to Amsterdam, and subsequently to Schenectady, where he had been for the last twenty years, making in all a professional practice of thirty-seven years.

## PERISCOPE.

The following chapter on dentition we publish by permission from the forthcoming edition of Dr. Garretson's work on "Oral Surgery."—Ed. DENTAL COSMOS.

DENTITION.—By dentition is meant the development of teeth. Teeth develop upon the bone proper of the jaws.

In the earliest days of fetal existence the jaws are planes of cartilage. These planes are overlaid by mucous membrane. Upon the cartilage, between it and the membrane, the papillæ known as dental germs are deposited.

The period at which dental germs are earliest met with is about the sixth week of intra-uterine life. At this period, a little sooner or later, such germs are to be exposed by lifting the mucous covering from the basement cartilage. At all subsequent periods previous to eruption, section through the overlying parts exhibits their presence.

The alveolar process, with its many pits, is simply an osseo-spongy tissue, serving as a common envelope to the growing tooth-germs. In its origin it constitutes the primitive dental groove. This groove is never, however, a ditch, or depression, except as such an idea is conveyed by the pits and depth of an adult jaw. Neither are alveolar process and body of bone one except as regard is had to relationship. Alveolar process is a provision associated with teeth; as dental germs develop so does it; when the teeth are lost so also does it disappear. Alveolar tissue grows around papillæ; the dental pits signify obstruction. The papillæ are not first met with in a groove.

A dental germ is made up of a congeries of granular nuclei dispersed irregularly through a firm homogeneous blastema. It is not inclosed in a cell-wall, or membrane, of its own; it is a hyaloid structure.

A developing germ carries with it the overlying mucous membrane; the membrane hugging it closely. This covering, or envelope, constitutes a tunic; it is to be denominated coat one, or tunica propria. The relationship of this covering to a papilla is precisely that of parietal peritoneum to a knuckle of intestine in incarcerated or strangulated hernia. The shape of the coat is that of the papilla it encircles.



While, after the manner described, a tunic has been secured by the tooth-germ, it is recognized that the common mucous membrane has in no wise altered its relation to surrounding parts; it adjoins closely all the circumference of a papilla; it is contracted, like an elastic bag, about its base; it associates from this base with adjoining parts.

Corresponding with the growth of a papilla is that of its alveolar envelope. As such envelope is of submucous nature, being an organization arising out of cells existing between the mucous membrane and plate of jaw, among which cells the germ lies, it is to be recognized that as this increases about the germ it necessarily carries around it a second coat, or tunic,—*tunica reflexa* it is not unwarrantable to call it.

This, now, is a dental relation: a germ, originally microscopic, has enlarged until it stands in shape and size the representative of a tooth; this germ is enveloped in a double sac; it is overgrown on all its circumference by tissue which, later, is to express itself as alveolar process and gum.

At this period the dental pulp, as the organ is now to be called, having attained the size of the tooth it represents, commences the formation of dentine. Before the attainment to full size by the papilla, there existed between it and its sac proper a *halitus*. This *halitus*, now that the congeries of cystoblasts or nucleated granules have obtained their full growth and secretive power, is replaced by a more highly endowed production, the work of matured cells. This secretion, deposited against the inner sac, between it and the pulp, contains the elements of the dentinal structure, is, indeed, the dentine, and deposits layer after layer, supported by and molded into form by the pulp. Calcification is progressive with secretion.

As this deposit deepens upon the mucous envelope, so the pulp contracts within itself, until, finally, it stops at that certain point which maintains within the tooth a canal, or cavity, and a vascular and nervous pulp to occupy it,—this pulp being the contracted original papilla. The vessels of this papilla are analogous to those of the ordinary papillæ of touch.

Why this secretion, in its organization, should assume the position of the elongated tubular cells which pertain to the structure of dentine, is not here to be discussed, and it is quite enough for our purpose to say that it is a law of form perhaps not to be fully comprehended, apprehension of which would, at any rate, have but little clinical signification.

The formation of dentine completed, the covering of it with enamel begins; or rather this deposit is, to a degree, coincident with the dentinal formation. Secreted by the same pulp which forms the dentine, the same secretion, some portion finds its way into and through the primary sac. As it passes through this sac and is received against the second it is modified, receives new elements, perhaps, which influence the arrangement of its particles after the hexagonal order, or the characteristic is to find explanation in the membrane against which it is received. Between the enamel, thus formed, and the dentine, exists the primary sac; simply the modified mucous membrane, which we first saw as overlying the papilla. This membrane continues its existence between these two hard

bodies, and receives and modifies, for the support of the enamel, the liquor sanguinis found in the dentinal tubules and intertubular structure. It is the enamel membrane. It is from this that we receive the impressions of pain when it becomes exposed by a break in the continuity of enamel.

The growth of a root of a tooth, as its dentine is concerned, has precisely the history of the body. Such growth is associated with pyramidal elongation of the pulp, which, pushing upward the crown, extends upon itself the enamel membrane and tunica reflexa. This elongation, with a greater vascularity and vitality assumed by it as approach is made to the basement vessels, modifies again the result obtained by the exudate passing through it from the dentinal pulp, the result being an approach to true bone in the production of cementum.

Periodontium is the modified external sac, lost, of course, above the neck, as the tooth has emerged through it.

Accepting the process of tooth-genesis as here exhibited, it becomes understood that enamel has no special pulp as propounded by the histologists. It is also understood that it calcifies from the outside inward, and not from the inside outward. It is as well seen that it is a vital tissue, nourished exactly as are other parts.

The description illustrates as well the manner and matter of periodontal formation. It exhibits that a correct naming of that tissue would designate it alveolo-odontal periosteum.

Also it is made plain that the enamel membrane is not strictly dependent on the pulp for its nutrition. It has two other sources of supply, namely, that received through the cementum from the alveolo-odontal periosteum, and that gotten from vessels which come to it from the apical supply.

ON THE SYMPATHY EXISTING BETWEEN THE EAR AND THE TEETH.—It has long been known and recorded in medical literature, that a peculiar reflex sympathy exists between the ear and the larynx and the ear and the teeth. These sympathies are always annoying and usually prejudicial to the integrity of the organs implicated. As these reflex phenomena can be made to vanish if their real cause is detected, it is the purpose of this paper to call attention to and briefly describe and explain some of the forms more commonly met, and show how these manifestations of disease can be quelled. . . .

A case of irritation reflected from the teeth to the ear may present itself in this way:

A brother practitioner of medicine asks for treatment of hardness of hearing, tinnitus, and a peculiar sense of discomfort in the left ear. His statement is that he believes he may have aural catarrh, and this view is strengthened somewhat by the appearance of the membrana tympani, which is lusterless, opaque, and retracted. But nothing being said about the teeth, the usual treatment for aural catarrh is instituted, and the patient is apparently better for a short time.

In the course of a year all the old symptoms are worse, and some new ones, more disagreeable, are added. These are considerable neuralgia in the post-auricular region, with a constant and pounding tinnitus, which is likened to a noise of a trip-hammer, synchronous

with the pulse, and a peculiar tapping noise, not synchronous with the pulse. The latter is about ninety times a minute, and seems to the patient to be attended with motion in the ear; it seems "as though some power pulled on a little string fastened to his drum." There are also laryngeal irritations in the form of ear-cough, which, though not excessive, seem to the patient to depend on the continued annoyances in the ear. *All of these symptoms came on and kept up during excessive pain in the first molar tooth in the upper maxilla on the same side.*

The patient now states that ten years before this molar tooth required filling, that ever since more or less discomfort has been experienced in and around it, that inflammation in its neighborhood has frequently occurred, with more or less intensity, and the aural symptoms had first shown themselves about six months after the tooth was filled. He also states that all dental disturbances ever since have been attended by aural discomforts, which have gradually increased until the final attack, three months ago, when both aural and dental sufferings became nearly intolerable, an abscess formed near the tooth, and at last the tooth was extracted, *with instantaneous relief from all forms of tinnitus, tapping sounds, and neuralgia in the ear, the ear-cough, which had been marked up to this time, ceasing, and the hearing becoming very much better.* The tooth shows great and peculiar disease at the root, and its socket is necrosed, so that its cavity is thrown into that of the socket of the second molar behind it, by destruction of the partition between them.

Let us trace the connection between the diseased teeth and the disturbed condition of the ear, which it is manifest must be a purely nervous one.

The three prominent symptoms in the ear were tinnitus, tapping sounds, apparently combined with muscular movements in the ear, and neuralgia. To explain the tinnitus, we first recall the fact that the teeth and sockets diseased in this case are supplied by the posterior dental branches of the superior maxillary nerve, an important division of the trifacial nerve. Then we bear in mind that this nerve, the trifacial, supplies the sensory root to the sphenopalatine ganglion, which brings the irritation to the sympathetic tract. For the sphenopalatine ganglion is connected with the carotid plexus of the sympathetic, by means of the deep petrous branch of the pterygoid nerve. The carotid plexus is distributed to the internal carotid artery and all its branches. One of these, the tympanic branch, supplies the membrana tympani, and other branches are sent to the drum-cavity. The vaso-motor nerves, derived from the carotid plexus, controlling the caliber of these vessels, are thus brought into the circle of irritation from the teeth and gums, their inhibitory power is overcome, and dilatation of the vessels ensues; more blood than usual passes to the drum-membrane and the drum-cavity, morbid vibrations in the walls of these vessels are set up, and tinnitus is heard; for *tinnitus aurium* is nothing more than the sound produced by abnormal vibrations in the walls of the arterioles or veinlets of the ear, or it may be the hearing of the normal movements of the blood on the part of an ear whose resonant functions are disturbed.

In order to explain the tapping sounds and the feelings of move-



ment in the ear, it must be borne in mind that the motor root, of the spheno-palatine ganglion is derived from the facial nerve, through the Vidian, and that the facial nerve supplies a filament to the stapedius muscle. The irritation conveyed from the teeth through this ganglion, over to the facial nerve and the stapedius muscle, causes the latter to be thrown into rapid clonic spasms, thus producing the tapping sounds, and a sensation to the patient similar to that of "pulling on his drum with a string."

It is not uncommon for pain in one part of a sensory nerve-tract to be attended by pain in a neighboring branch of the same parent nerve. Hence, in this case, besides pain in the dental branches of the superior maxillary nerve, directly irritated by diseased teeth and gums, there has been experienced *neuralgia* in the temporomalar branch of the maxillary nerve. The ear-cough experienced by the patient must have been due to a reflection of the dental irritation over the spheno-palatine branches of the superior maxillary nerve, to the spheno-palatine ganglion, thence through the Vidian, over the facial nerve to the auricular branch of the pneumogastric nerve, which is connected with the facial by a branch from the latter nerve at its exit from the stylo-mastoid foramen. Having thus reached the tract of the pneumogastric, the reflection passes by the motor fibers of the pneumogastric, through the superior laryngeal nerve, to the crico-thyroid muscle, which is thrown into reflex spasms, constituting cough.

It is thus seen how some of the most common aural symptoms may be purely reflex in their origin, very distressing while they last, quite intractable unless their cause is fully recognized, but remediable when their causation is understood.—*Charles H. Burnett, A.M., M.D., in the Specialist and Intelligencer.*

A PRACTICAL DENTIST.—From the *Wiener Illustr. Extrablatt* we take the following history, upon which comment is unnecessary:

"A tragico-comic event was yesterday brought to light before the police commissioner of the interior part of the city.

"The dentist, Dr. W., was so much occupied that he concluded he must educate a practiced assistant upon whom he could depend for help. The assistant was soon found, and the practical course in tooth-extraction began.

"The dentist found it impossible to degrade his celebrated health institute to that of an experimental place for a stupid stick. It was also inadmissible to trust to an unpracticed hand the patients whom he was accustomed to relieve of their teeth and suffering at heavy cost, so the doctor hit upon the not very new expedient of operating upon some poor patient who would permit the helper to extract the teeth.

"Now began the hunt after a patient. The doctor and his helper frequented the drinking-places and stores, questioning all store-women and salesladies as to the condition of their teeth, and if any complained of decayed teeth they were at once advised to submit themselves to the care of the assistant,—operation gratuitous. For a long time the doctor failed to secure a proper subject for demonstration, until by accident a poor girl came to him, who, for long years, had been plagued with toothache. She was in triumph es-

corted to the *atelier* and placed under the influence of 'gas.' The assistant seized the forceps and the practical course began.

"The Doctor commanded, the assistant pulled, everything cracked and snapped. As the young woman awoke, the pain was gone, but also all her teeth had disappeared; not less than sixteen had the industrious scholar extracted from the jaw. The upper teeth were entirely gone, and the maiden cried aloud over the loss of her teeth. Her face was disfigured, her cheeks fallen in, and her speech difficult to understand. She inquired of the doctor whether he would, as indemnification, insert an artificial set? But this proposition the doctor could not comprehend, and persistently refused; so the martyr to dentistry found no way out of the trouble but through the police. They sent the case to the circuit judge for further examination, before whom, in a short time, there will be a very interesting civil process play.

"The mechanical dentist, Herr D. Herzl, had in the mean time offered to fill up gratuitously the gap made by the unrelenting apprentice to tooth-extraction."—T. *Translated for the DENTAL COSMOS from Die Zahntechnische Reform, Berlin.*

**MULTIPLE PAPILLARY TUMORS OF THE LABIAL, BUCCAL, AND GLOSSAL MUCOUS MEMBRANE.**—Alice N., aged nine, was brought to my office June 13, 1880, by her mother, who requested me to examine the interior of the child's mouth, "for," as she said, "there is something growing there." I complied with her request, and on inspection I found a very remarkable state of affairs. The mucous membrane of both lips, from the point where it is reflected on to the gums out to the muco-cutaneous junction, that lining both cheeks, as far back as the second molar tooth, and that covering the anterior half of the dorsum of the tongue, was studded with tumors, varying in size from that of a millet-seed to that of a large pea. On the labial and buccal mucous membrane the tumors were sessile, and so thickly set that in places they actually crowded one another. On the tongue the papillæ were in various stages of hypertrophy, some being but slightly enlarged, while others had formed quite large pedunculated and slightly-lobulated tumors. The epithelium covering the tumors presented its normal appearance. The tumors manifested no tendency to hemorrhage or ulceration. It is proper to state here that the tonsils were hypertrophied also. The affection was symmetrical, there being as many tumors on one side as on the other. The mother said that about a year before she brought the child to me she noticed two or three small growths on the mucous membrane of the lower lip; hence the spread of the affection had been quite rapid, as at the time of examination there were not less than one hundred tumors of various sizes.

The fact of the hypertrophy being symmetrical might lead us to suspect a constitutional cause; but I could ascertain no history of syphilitic or other taint which might be assigned as a cause.

In the way of treatment I gave the patient internally five grains of potassium iodide, in solution, after each meal, and I directed the local application of a saturated solution of sulphate of iron three or four times daily. This treatment has been followed by a prompt disappearance of the tumors.—*Dr. C. J. March, in St. Louis Courier of Medicine.*

**SYMMETRICAL NEURALGIA IN DIABETES.**—M. Worms (*La France Méd.*, 1880, p. 627) thinks that no new fact which may aid in the rational classification of the different varieties of diabetes ought to be neglected. For this reason, he communicates notes of two cases of symmetrical neuralgia in the sciatic and in the inferior dental nerves occurring in the course of diabetes. This variety of neuralgia has not heretofore been described. M. Worms's conclusions from these cases are as follows:

1. There is a peculiar form of neuralgia which may occur in connection with diabetes, and which is characterized by affecting two symmetrical branches of the same nerve.

2. Thus far this form of neuralgia has been observed only in the dental and sciatic nerves.

3. Diabetic neuralgia appears to be much more painful than ordinary neuralgia.

4. It does not yield to the ordinary treatment of neuralgia (quinia, morphia, bromides); it becomes aggravated *pari passu* with the progress of the diabetes.

M. Worms classes this form of neuralgia with the diathetic varieties observed in gouty and chlorotic persons and in lead-poisoning. He leaves undetermined the question as to the existence of any perceptible lesion of the nerves of neurilemma.—*Philadelphia Medical Times*.

**CAUSATION OF RACHITIS.**—To combat the theory that in rickets there is a waste of the lime-salts, the writer examined the urine of rachitic and non-rachitic children. He found that in the former there was less lime excreted than in the latter. The poverty in lime-salts which rachitic children suffer from must therefore be due to a want of the supply. But the poorest food has been found to be sufficiently rich in lime to supply the economy. Hence the defect in this disease must be in the digestion or assimilation of food. A lack of hydrochloric acid is supposed by Seemann to cause this, and, on theoretical grounds, he advises in treating rickets to supply the system with chloride of sodium in as large quantities as possible, given either in the food or in salt baths, as chloride of sodium has been found to yield its chlorine readily.—*E. H. Bradford, M.D., in Boston Medical and Surgical Journal*.

**SINGULAR OBSTRUCTION OF WHARTON'S DUCT.**—At his clinic Prof. Richet drew attention to a curious case in the person of a young man who, while eating some bread, was seized with a sudden lancinating pain, the tongue being so much raised by a swelling which took place under it that the patient could hardly speak. The nature of the foreign body which was supposed to be in Wharton's duct was sought for in vain, when a day or two after the patient felt with his tongue the sharp point of some object. This could not be seen, but some days later a very minute fragment of straw was removed from the duct. This probably had been in the bread, and became introduced into the duct during mastication. In a well-known case of Robert's a bristle became engaged in the canal.—*Gaz. de Hôp.*



## HINTS AND QUERIES.

"He that questioneth much shall learn much."—BACON.

CORRESPONDENTS desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

WILL some reader of the DENTAL COSMOS inform me whether there is any pain attending the recuperative efforts of the pulp, and if so, what are the symptoms from which to obtain a diagnosis? Also, can there be such a condition as chronic inflammation of the pulp independently of caries, exposure of pulp, or of mechanical injury of the tooth? and, if so, what are the etiology and symptoms?—F. R. NEWCOMB, D.D.S.

WILL some one kindly inform me how to use articulating paper? Not what it is used for, but how to use it. I have tried to use it, but failed, because it is so stiff and unyielding.—DENTIST.

REPLY TO "STUDENT," who asks whether tobacco favors or retards decay of the teeth. We believe that the use of tobacco hardens the enamel and dentine. All dentists must have observed that in the mouths of patients who use tobacco liberally, though there may be a number of cavities, they are all small, and the decay black and hard. My experience leads me to believe that tobacco not only prevents, but even arrests decay. How it does it remains to be explained. Tobacco-chewers are, however, prone to use the quid on one side of the mouth, which has a tendency to injure the gums and leads to using that side of the mouth only in masticating food. If I am correct in assuming that tobacco-smoking causes a change in the density of the enamel and dentine, will some one explain how this effect is produced.—LOUIS OTTOFY.

ANSWER TO "STUDENT," DENTAL COSMOS for January, 1881. The use of tobacco retards the decay of the teeth by causing a greater flow of saliva, thus changing the secretions in the mouth often, and preventing fermentative changes.—T. F.

ANSWER TO A. F. UU., DENTAL COSMOS for January, 1881. My method of bleaching discolored teeth is to thoroughly excavate all the discolored dentine. In the case of a front tooth, much discolored, the remaining shell will be so thin that the position of the excavator may be seen through the enamel. Fill the body of the cavity with any kind of artificial bone, light shade, and the orifice with any filling preferred. This gives the best result I have ever been able to obtain. I do not think the introduction of any kind of acid or other bleaching preparation will produce any considerable results, owing to the impermeability of dead tooth-bone. The apparent return of dark color in a bleached tooth is, I think, owing to the fact that dead bone readily gives up its moisture; and when kept dry by the rubber dam during an operation, the bone becomes dry, and, as a consequence, of a much lighter color. The patient is discharged with a nicely-bleached tooth, which in a short time will again take up moisture and return to nearly the same shade as before. This phenomenon is not peculiar to oxalic acid, but will occur if nothing is used.—T. F.

REPLY TO A. F. UU., DENTAL COSMOS for January, 1881. To cure "constantly-recurring sensitiveness" in grinding teeth the most efficient way is to cut out and fill to the enamel.—T. F.

REPLY TO N. A. S., DENTAL COSMOS for January, 1881. The replanted tooth in this case had its vitality so nearly destroyed by the chronic abscess that enough life was not left in the bone to form a healthy union with the surrounding tissue in the jaw, and consequently it could not resist the destructive action of those giant-cells which are always present when there is any dying or useless material which needs their scavenger services.—T. F.

UNDER the head of "Something About Metal Fillings," Edward S. Niles, D.M.D., Boston, says: "the protrusion of amalgam above the margin of some cavities . . . is due to expansion while setting," according to the generally entertained opinion. He also says, Prof. Chas. A. Myer, of Springfield, "suggests that it is due to the oxidation of some metal or metals next to the tooth-substance."

Now, with due respect to the opinions of any and everybody, I wish to state in the most positive manner, that there is nothing whatever in the foregoing, except what has been *imagined* from seeing the edges of amalgam fillings standing higher than the adjoining enamel, and all from the amalgam overlapping the enamel when finished, and afterwards crumbling off until a thick portion was reached that was too strong to crumble further. Only this, and nothing more.—W. E. DRISCOLL.

IN the Periscope of the January number of the DENTAL COSMOS a new method of filling single-root teeth is given. I resorted to a somewhat similar expedient on November 11, 1880. It was in a case of a single-rooted lower molar, where caries had enlarged the root-canal almost up to the apex; the lingual and anterior walls were even with the gums. I had treated it for a week, when the patient informed me that she could not come again for six weeks. I did not know what to do at first, as there was quite a fetid discharge; but I hit on the following plan: I placed the end of a waxed thread in the foramen and packed amalgam around it till within one-eighth of an inch from the top, when I bent the thread at right angles and brought it out anteriorly. I then finished filling the cavity, and after I had smoothed the filling up I held a spatula against the filling at the side of the thread and withdrew the thread. I have not seen her since, but I learn that she is not bothered by the tooth. I resorted to the same procedure about a month ago, with a like result. The thread was brought out at the side of the tooth to prevent food from being forced in.—WILLIAM D. KEMPTON.

I SAW a case to-day which, I think, will interest the readers of the DENTAL COSMOS, and be a hard nut to crack for those persons who have asserted that gold is the worst material with which to save teeth. In the mouth of a "fine old English gentleman" I saw a *gold filling* in a superior molar put in by Dr. Cortwright, in London, *fifty-seven years ago*, and which is still saving the tooth, and is likely to do so if the gentleman should live fifty years longer.—N. W. WILLIAMS, D.D.S.

A VIRTUAL ENFORCEMENT OF THE DENTAL LAW IN PENNSYLVANIA.—In the case of the Commonwealth *vs.* Nelson P. Duffy, an indictment for practicing dentistry in violation of the law regulating the same, enacted in 1876, the prosecution being brought by the committee appointed by the Pennsylvania State Dental Society to enforce said law, in the court held in Hollidaysburg, Blair County, January 24, the Grand Jury found a true bill, and the case was called for trial Tuesday A.M., the 25th, when, owing to failure on the part of the defendant in appearing for trial, the court ordered his bail of three hundred dollars forfeited.—A. B. C.

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No. 4

ORIGINAL COMMUNICATIONS.

ODONTOLITHUS INFLUENCED BY CALCIC AND PHOSPHATIC  
DIATHESIS.

BY EDW'D S. NILES, D.M.D., BOSTON, MASS.

(Read before the New York Odontological Society, December 21, 1880.)

THE subject which I have been invited to present this evening is one offering a field of study much too large to be embraced in a paper like this.\* That which I have to present is more especially to introduce some points relative to salivary calculus from a new stand-point.

In the consideration of this subject, it is not my intention to ignore the experience of old practitioners, but rather, by means of our present teachings in chemistry, physiology, microscopy, and pathology, to prove or disprove the theories which have been advanced. It has been claimed that there is a disease which attacks the periosteum, gums, and alveoli of the dental arch, characterized by more or less discoloration, heat, and swelling of the soft tissues. This condition continues until the teeth become loose; pus appears about the cervixes, the alveoli and periodontal membrane are absorbed, and the teeth involved become exfoliated.

Another condition of these parts is described, identical with the above, except that there is present a deposit of lime-salts about the necks of the teeth, which irritates the adjacent soft tissues, resulting in the conditions above named.

So far as I have been able to ascertain, the theory generally entertained in regard to this local irritation, is that it is *chiefly*, if not *wholly*, due to the deposit of calculi.

Of six hundred mouths examined at the Massachusetts General Hospital last summer I did not find one with this affection of which it could be said that salivary calculus *was not*, or *had not* been, present at *some time*, while in one hundred and five cases there



was *abundant proof* of its presence (located at points where it was especially adapted to irritate the surrounding parts).

The theory has been advanced that the deposit is a *secondary effect* in the progress of the disease, and that the lime-salts may be accounted for in three ways:

(1) That they are derived from the alveolus, which is dissolved by some chemical process.

(2) That they are precipitates from pus and serum.

(3) That there are glands in the mouth whose office it is to secrete these products, and which, being over-stimulated by inflammation, secrete more than the normal amount,—the excess being deposited about the teeth.

But there are difficulties in the way of accepting either of these theories. It is well known that when a number of teeth are removed, a process of repair and absorption goes on through the intervention of the lymphatics and capillaries. Roughened surfaces are made smooth and depressions filled, not by any excretion of bone materials into the mouth, for the process continues long after the tissues have closed over the parts, which precludes the possibility of these salts being excreted into the oral fluids. So, in like manner, it seems evident that the absorption of the alveoli in this affection is a physiological function of the circulatory system. That calculi can be precipitated from pus or serum in such quantities is hardly probable. Chemical analysis of pus, according to Robert Druitt, shows that it is composed of water, 86 per cent.; salts, mostly potassa, 8 per cent. The remaining 6 per cent. is fat, albumen, and animal matter. Schwilgné, a German observer, has however, found that it contains a small proportion of phosphate of lime.

Serum, the aqueous portion of the blood, coming directly from this nutritive fluid, must contain all of its constituents, with the exception of the blood-corpuscles and fibrinogenous substances. Serum must therefore contain a small proportion of the phosphates and carbonates of lime, but the amount present in both serum and pus is so very small that there would necessarily need to be a larger amount excreted than we usually see, to account for the incrustations found in many cases.

The third and last supposition seems to be a question of anatomy. Are there glands in the mucous tissue of the mouth which secrete calculi? No such glands have, to my knowledge, been described, and it is not easy to conceive what purpose they could serve in this location.

It can hardly be proved, therefore, by these theories, that salivary calculus is a secondary effect of the inflammation, or that a disease was in progress before its deposit.

It is a question whether or not the symptoms referred to occur without calculus as the local exciting cause. *Its absence does not necessarily signify that it has never been present at all*; for it is well known that these salts are soluble in acids formed by the putrefaction of carbonaceous and nitrogenous materials. These conditions and changes are abundantly favored behind the incrustation near or beneath the free margin of the gum about the roots of the teeth. In this position the acids could readily decalcify the deposit, rendering it soft, as we so often see it in advanced stages of this affection.

In a great many cases the nodular or granular deposits far up on the root will be the only trace of the salts that can be found; but these alone are sufficient to cause all the *irritation and inflammation* usually present when a *foreign substance* is introduced into living tissue.

It is therefore safe to say *that ninety-five per cent. of the cases of this kind met with in private practice are due to the deposit locally of lime-salts about rough surfaces on the teeth*, the nucleus being usually at the point where the enamel joins the cementum.

It is commonly taught in the medical schools, at home and abroad, that salivary calculus is a precipitate from the saliva as a whole. Such teaching is evidently correct, from the fact that the points where we usually find calculi most abundant are on those teeth nearest the orifices of the salivary ducts, as on the lingual surface of the inferior incisors, near Wharton's duct, and the buccal surface of the first and second superior molars adjacent to Steno's duct. Saliva is secreted from the blood by the salivary glands, and, as found in the mouth, contains a varying proportion of the different lime-salts. It is claimed by different authors that these salts are held in solution in the blood by carbonic acid ( $\text{CO}_2$ ), but on passing through the glands and ducts, and coming into the mouth, the absence of pressure and the contact with air allows a portion of the carbonic acid to escape as carbonic acid gas, and if the saliva is alkaline the lime-salts are thrown down as an amorphous precipitate, lodging on rough surfaces about the teeth, particles of food, epithelium, and mucus becoming intermixed, and the whole mass becoming hard, by some process, after a length of time. If, however, the saliva be acid, this deposit does not take place, as the flocculent precipitate is quite soluble in acids. Now, this is what takes place, so far as carbonate of lime is concerned, and it can easily be illustrated by passing carbonic acid gas through lime water until the solution is clear, and then boiling it to expel the gas.\* We have a good illustration of this when the cork is removed from a bottle of mineral water, which

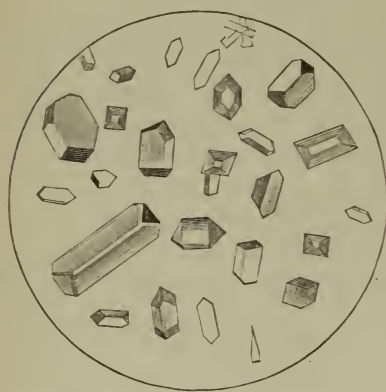
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\* Bloxam's Chemistry, p. 78.

holds in solution a large proportion of carbonate of lime. After a portion of the gas has escaped, the water becomes milky, and on standing still longer, small crystals of lime will be found on the sides and bottom of the bottle. This is best observed in water that has recently been drawn from springs deep in the earth. To this influence of carbonic acid gas is due the deposit about mineral springs. A marked accumulation is to be seen at the High Rock, Saratoga.

But salivary calculus is seldom composed wholly of carbonate of lime. Analyses by Berzelius, Bibber, and Schmidt show that it contains not only carbonate ( $\text{CaO}, \text{CO}_2$ ),\* but phosphate of lime ( $3\text{CaO}, \text{PO}_5$ ),† and phosphate of magnesia ( $2\text{MgO}, \text{PO}_5$ ),‡ and in extremely aggravated cases of this trouble, where inflammation, exudation, and decomposition of carbonaceous and nitrogenous materials have gone on to a considerable extent, the ammonia thus produced may combine with phosphoric acid and magnesia, and form a triple salt, termed ammonia-magnesian phosphate (Fig. 1.), ( $2\text{MgO}, \text{NH}_4$

FIG. 1.



Crystals of ammonia-magnesian phosphate from urinary sediment.—Neubaur and Vogel.

$\text{OPO}_5 - 12\text{HO}$ ),‡ upon which carbonic acid gas has not the same influence. The last-named salt may also be taken directly from the blood by the salivary glands. It is soluble in acids and insoluble in alkalis, like the other salts. Escape of carbonic acid gas then assists only in the precipitation of carbonate of lime. Precipitation of the three other salts (or the phosphates of lime and triple salt) must be accounted for by an alkaline or natural condition of the fluids in the mouth.

The deposit varies in chemical composition in different mouths, some presenting more carbonates than phosphates, or perhaps the magnesian salts may predominate. I have not been able to find two analyses of calculi which give the same relative proportion of salts, but Bibber, Schmidt, and Berzelius agree that all these salts may be present, viz., phosphates of calcium and magnesium, and carbonate of calcium.

Magitot's work on "Dental Caries" says, "There are sometimes found sixty parts in one hundred of phosphates; in other cases nearly the same proportion of carbonates."

\* Bloxam.

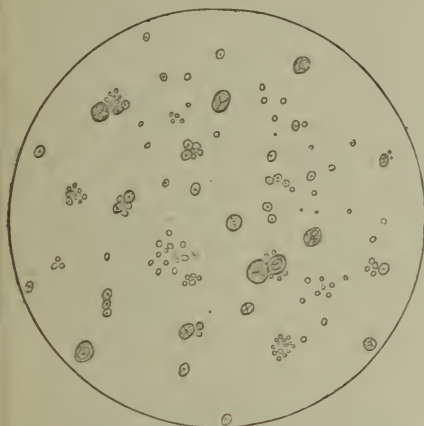
† Neubaur and Vogel.



As has been said, this precipitate cannot take place in a very acid solution, and its presence in the oral cavity must therefore indicate an alkaline reaction of the saliva, though not necessarily strongly so, for phosphate of calcium crystallizes in neutral or very slightly acid solutions.

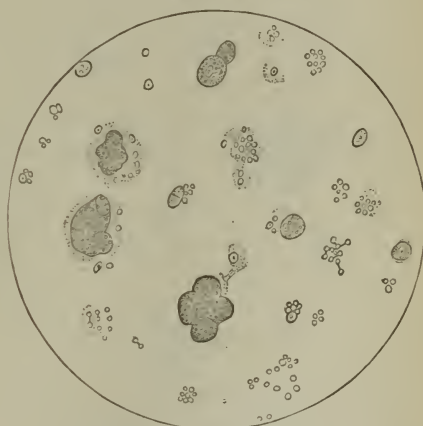
The most commonly accepted theory in regard to dental caries is that it is caused by acids. So far as I have been able to learn from older dentists and from my own observations, those who have the affection we are now considering have comparatively little decay of the teeth involved. Further than this, you will agree that the deposit is associated with an abnormal secretion of mucus. The healthier a mucous membrane the less mucus does it secrete,—just enough to keep the surface moist and clean, but when it is irritated and inflamed, the secretion is very much increased. Mucus is composed largely of nitrogenous materials, and very strongly resembles vegetable albumen. When normal, it is alkaline, and during decomposition becomes more strongly alkaline by the formation of ammonia, which adds to the alkalinity of the fluids in the mouth. The albuminous or mucous elements play a very important part in the formation of the calculi, not from alkalinity alone, but by in-

FIG. 2.



Calcoglobulin from solution of calcium carbonate in albumen, precipitated by ammonia,  $\frac{1}{2}$  objective.

FIG. 3.



Calcospherites from a solution of calcium carbonate in albumen, precipitated by ammonia,  $\frac{1}{2}$  objective.

fluence upon the salts of lime when precipitated in their presence.

C. S. Tomes,\* in speaking of calcification, says, salts of lime precipitated in presence of albumen or mucilage organize into globules, called calcoglobulin. (Fig. 2.) These aggregate and somewhat lose

\* Tomes's Dental Anatomy, p. 139.

their individual spherical shape, forming what have been called calcospherites. (Fig. 3.) As calcification goes on, these again cluster, and at length a hard, yellowish mass is formed; but if the albumen is not present the deposit remains amorphous or becomes crystalline.

A Mr. Rainie observes that the albumen forms a true matrix, which is capable of retaining its shape and structure, even after the removal of the bulk of lime by acids.

Now, if you take a well-calcified lump of tartar and place it in dilute muriatic acid, it will in a few days be decalcified, but the shape and contour of the lump will be retained, showing that it has a matrix, though of course not as well organized as bone. Calcoglobulin and calcospherites spoken of will also be found in soft deposit in the mouth of a patient suffering from the trouble under consideration. Further than this, compound crystals of phosphate of magnesium and lime will be found. Phosphate of magnesium, so far as I have observed, precipitated by ammonia from an acid solution, in presence of albumen, presents beautiful fern-shaped crystals. (Fig. 4.) Phosphate of calcium, under the same conditions, forms into long, wedge-shaped or compound crystals. (Fig. 5.) The three

FIG. 4.



Phosphate of magnesium precipitated from albuminous solution,  $\frac{1}{2}$  objective.

FIG. 5.

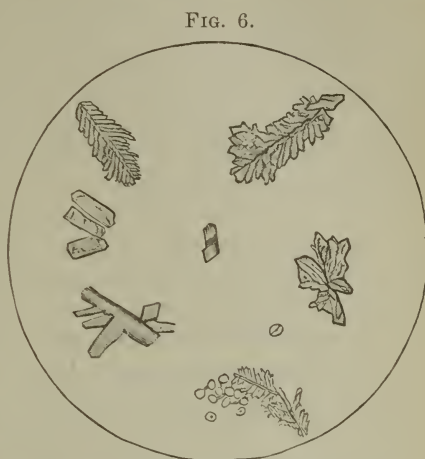


Crystals phosphate of calcium from the mouth of a patient suffering from odontolithus,  $\frac{1}{8}$  objective.

combined, three weeks after precipitation in albumen, may give a compound crystalline mass, in which neither salt wholly loses its identity. (Fig. 6.) These compound crystals are not readily found in the recent deposit in the mouth, from the fact that the precipitation is usually slow, allowing the intermixture of food, epithelium, and various coloring matters. The individual crystals of phosphate of calcium, triple phosphates, and calcoglobulin are readily found.

The first and last have most frequently been present in the specimens which I have examined.

If a lump of salivary calculus be decalcified with hydrochloric acid and this solution filtered, the salts of lime are thus separated from foreign substances. If the filtrate be treated with albumen and ammonia, a precipitate of the salts occurs, which, after standing for a day, shows what salts are present. Phosphate of calcium crystals produced in this way are most frequently wedge-shaped. It is therefore evident that the agents that most influence this precipitate and its hardening are carbonic acid gas, certain alkalies, and a viscid condition of the saliva.



Crystals of calcium, magnesium phosphate, and carbonate of calcium, precipitated in albumen,  $\frac{1}{8}$  objective.

It may be asked, How shall we account for the nodules on the root of a tooth in a pocket formed by it and the surrounding tissue? This may be explained in three ways: First, they may have reached there by mechanical means from the saliva. Or, second, as has been said, pus and serum contain a small amount of lime-salts. Surgeons say that musket-balls and foreign substances, long imbedded in the flesh, become enveloped in a coating of lime-salts. The root of the tooth, with the periodontal membrane destroyed and surrounded by inflamed, exudating, irritated tissue, would represent almost the same conditions. Third, Billroth,\* in his work on surgery, speaking of chronic periostitis, says that there is often present a nodular osseous deposit, situated at the point where a blood-vessel enters the bone. This would indicate that the periosteum, being thus irritated, had made an attempt to resume its embryonic power of bone-formation at this point. This seems to furnish the best theory for the origin of nodules on the cementum. They would be deposited at the time the inflamed and receding periodontal membrane was at this point.

I have said that the greater amount of salivary calculus is a precipitate from the saliva as a whole. That saliva contains these salts of lime and magnesia is easily demonstrated by adding to a quantity

\* Billroth's Surgical Pathology, p. 301.



of saliva hydrochloric acid;\* filter and precipitate with ammonia. The precipitate usually forms at once; if not, let it stand a few hours or over night.

The analyses of saliva, like those of salivary calculi, do not agree. The proportions of lime or magnesium are variable in the saliva of different persons, also in the mouths of the same persons at different times of day. The analysis most frequently referred to by different authors is that of Bibber and Schmidt.† They find carbonate of calcium and phosphates of calcium and magnesium present, ninety-eight parts in ten thousand.

When we consider that there are normally secreted from a thousand to sixteen hundred grammes, or about three pints of saliva in twenty-four hours, it is not unreasonable to suppose that this incrustation may be formed from this secretion, especially when the salts are increased by an abnormal condition of the system. There are cases which we are called upon to treat that give unmistakable evidence of there being more than a normal amount of these salts in the saliva. The chemical composition of the saliva, with the exception of ptyalin depends upon what is taken from the blood by the salivary glands, as previously stated. Therefore, in these cases, there must be a more than normal amount of lime-salts and magnesia present in the circulating fluid, or a calcic and phosphatic diathesis. In support of this we may instance other glandular excretions, as those of the kidneys.‡ The concretions most commonly found in the urine consist of the urates, oxalates of lime, carbonate and phosphate of lime, and magnesia and ammonia-magnesian phosphates. The first two are found in acid urine, the consideration of which is not necessary. The phosphates and carbonates are, however, precipitated in alkaline or nearly neutral urine, and their presence is of considerable interest to us in connection with this subject, especially when we consider the physiological fact that the salivary glands may perform vicarious secretion for the kidneys. There are few facts better established than that certain substances discharged from the body, called excretions, represent the wear or waste from the system. All such matter is thrown into the circulation from the tissues, and is secreted from the blood by the proper organs; but these organs have nothing to do with the production of the substances,—their office is to purify the blood by eliminating effete matters. It is not disease in the kidneys that causes sugar, urates, or phosphates in the urine. These are often

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\* When this acid is added, if it causes effervescence it indicates the presence of lime-salts.

† Dalton's Human Physiology, p. 146.

‡ Works of Drs. Neubaur and Vogel on the Urine.

due to defective nutrition and assimilation, depending directly or indirectly on constitutional disturbances communicated through the nervous system.

In the examination of one hundred and three cases of odontolithus, I found thirty-six that were suffering from known chronic troubles, and seventy-one I marked on my record "debility;" the cases presenting no apparent lesion, though not in vigorous health.

The best authors say, that for the most part phosphates in the urine result from an abnormal condition of the system, as dyspepsia, excessive fatigue, mental or physical overwork, protracted illness, or any unusual strain on the system.

Professor M. J. Teissier, of the university at Lyons, France, in a paper, an extract from which was published in the London *Lancet*, 1873, says, the normal amount of phosphates excreted in twenty-four hours is from ten to twenty grammes, or about one-fourth to one-half of an ounce, but he has observed very grave cases where there was an increase of from four to ten times that amount, and suggests that this increase is possibly due to an overworked nervous system, causing the use of more phosphates at the nerve-centers. Professor Teissier is said to be very careful in his observations and statements, which are generally credited among medical authorities.

Others have attempted to prove a possible phosphi-uria, resembling diabetes,\* due to the presence of a large amount of phosphoric acid in the circulation. Such views are not, however, substantiated by any known facts.

The local conditions which favor precipitation in the urine and saliva are the same. In the former, however, the mucus coming from the mucous membrane of the urinary tract, the alkalinity may be frequently due to the presence of ammonia. It cannot be said that debility is the exciting cause of salivary or urinary calculus, though in nearly every case there are indications that the general health is below normal. Strictly speaking, *debility* indicates a permanently abnormal state of the system. Fatigue or temporary nervous excitement cannot be called debility, though urinary or salivary calculus indicates an abnormal condition of the system.

A tendency to produce an over-amount of carbonate and phosphate of lime, and phosphate of magnesium, is not necessarily indicated in the urine and saliva at the same time by like deposits, for one or the other may be acid. Normal urine is sufficiently acid to hold the salts in solution. If, however, it was temporarily alkaline, there might not be a nucleus for the accumulation and hardening of the precipitate. An actual test of both fluids is the most positive

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\* Phosphatic Diathesis by Dr. Prout.

way of proving the presence of a diathesis, where indicated by large and persistent deposits on the teeth. An analysis of the deposit in the mouth will serve somewhat as an index to the exciting cause. Should there be a predominance of carbonates and phosphates of calcium, it would signify that the osseous system might be directly or indirectly suffering. Should there be, however, more phosphates of magnesia, it would direct attention to the nervous system.

That the quantity of lime in the food and water taken into the system has a tendency to increase or decrease this accumulation there is no doubt. The most marked cases of odontolithus that have come under my observation were those of three old people who drank from the same spring (highly impregnated with lime) for many years. It is also a very significant fact that dentists who practice near our mineral springs find a greater proportion of their resident patients suffering from this trouble. Few old people escape the effects of this deposit. In the observations made, one in six who applied to the infirmary for dental treatment presented either large deposits of calculus, or inflamed gums resulting from such deposits. The ages of those thus suffering from the effects of odontolithus ranged from ten to seventy-six. Two-thirds of the number were females. The child of ten was rachitic,—very significant of the source of an excess of lime-salts in the secretions and excretions. A number of the oldest patients who presented the most advanced stages of inflammation had been, or were at that time, suffering from urinary trouble, and doubtless there was more or less vicarious action of the salivary glands.

There is a large field for study and observation in this direction, as has been said. The varying color and hardness of the accumulation found upon the teeth at different periods of life, and in different mouths, with the knowledge of a possible vicarious function of the salivary glands for the kidneys indicate something more than the "tartar" spoken of in our text-books, and the dental specialist may look with no less interest than the general practitioner for the answer to the question: What is the cause of an excess of phosphates and carbonates in the circulation?

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## AN APPLIANCE FOR CONGENITAL CLEFT PALATE.

BY HENRY A. BAKER, D.D.S.,

LECTURER ON ORAL DEFORMITIES, BOSTON DENTAL COLLEGE.

(Read before the Massachusetts Dental Society, December 9, 1880.)

ONE of the most distressing deformities which the dental practitioner is called upon to treat is that which is known by the name of



*cleft palate.* This peculiar and unfortunate malformation is sometimes caused by accident or disease, and in other cases it dates from birth; and from the manner of its origin it is classed either as accidental or congenital. But whatever may have been the origin of the trouble, the same phenomena often occur as common to both classes; although, even when the openings presented are precisely similar in form, the methods of treating cases of these two varieties are naturally very different. A case of accidental cleft palate may be successfully treated with a very simple appliance, while the same amount of skill exercised on a congenital cleft would have no beneficial result. This may be accounted for by the fact that in the former case the patient had learned to articulate distinctly and use the organs of speech efficiently and correctly, while persons who are thus deformed from birth are obliged to learn the art and methods of articulation by slow and painful processes. The organs require the training which is necessary for one who acquires a new language. Hence the appliance for relief should not only fill up the gap in the defective palate, but must also be so constructed as to work on physiological principles in harmony with the natural movements,—that is to say, it should be under the perfect control of the surrounding muscles. It is manifest, therefore, that the success even of the most scientifically-adjusted instrument depends largely upon the co-operation of the patient who uses it.

Nearly three hundred years have passed since the attention of scientific persons was first directed to these phenomena of palatal malformation and the primitive appliances were formed for their relief. These instruments were termed *obturators* (from the Latin word *obturare*, “to stop up”), and were made from rolls of cotton, pieces of sponge, etc., etc. A wide interval of years, and the researches of many patient and industrious dentists, separate the era of these crude and unsatisfactory attempts from the perfected scientific appliances of Dr. Suersen. The most important and significant advance in this department of science made itself manifest in attempts at the formation of an artificial *velum*, and Dr. Stearns was probably the first to introduce its true principle. I speak of these two investigators—Suersen and Stearns—because I am led to think that they have brought before the profession the most scientific apparatus of each class, and it is from a consideration of both of their appliances that I have evolved the principle of my own, in explanation of which this paper has been prepared.

In 1867, Dr. Suersen described before the Central Association of German Dentists, at Hamburg, his method of constructing obturators. In December, of the same year, a report of his lecture was published in the *American Journal of Dental Science*. In Johnston's

*Dental Miscellany* for December, 1877, Dr. Kingsley's history of obturators gives an abstract of the same, and I deem it best to use Suersen's language in describing his obturator, quoting from Kingsley's late work on "Oral Deformities."

"In order to be able to pronounce all letters distinctly, it is accordingly necessary to separate the cavity of the mouth from the cavity of the nose by means of muscular motion. That separation is, under normal conditions, effected, on the one hand by the velum palati, which strains itself (consequently by the levator and tensor palati); but, on the other hand, also by a muscle which, to my knowledge, has, in connection with these operations, not yet received a sufficient amount of attention,—I mean the *constrictor pharyngeus superior*. This muscle contracts itself during the utterance of every letter pronounced without a nasal sound, just as the levator palati does. The constrictor muscle contracts the cavum pharyngo-palatum, the pharynx wall bulging out; and it is chiefly on the action of this muscle that I base the system of my artificial palates.

"These palates, which in all their parts are made of hard caoutchouc, consist of a tooth plate suitably attached to existing teeth, and which, at the same time, covers the fissure in the hard palate, (if such a fissure exists.) Where the fissure commences in the velum, that plate terminates in an apophysis broad enough for filling up the defect. This apophysis is at the same time of such thickness as to keep up a contact between the high edges forming the sides of the apophysis and the two halves of the velum, even when the levator palati is in activity. To bring about this contact the more surely, the high edges forming the sides do not rise straight, but obliquely towards the outside. The lower surface of the apophysis, turned towards the mouth, lies on about an equal level with the velum, *if the latter is raised by the levator palati*. But when the velum hangs loosely downward, the back part of the artificial palate is lying over it. This back part accordingly fills up the cavum pharyngo-palatum, and in such a manner as not to impede the entrance of the air into the cavity of the nose when the constrictor pharyngeus superior is inactive. Thus the patients can, without any impediment, breathe through the nose. But as soon as the constrictor contracts the cavum pharyngo-palati (this happens, as I will repeat for the sake of clearness, in the utterance of every letter, with the exception of *m* and *n*), the muscle already named reclines against the vertical back surfaces of the obturator. By this operation the air-current is prevented from entering the cavity of the nose and compelled to take its way through the mouth, and thus the utterance loses its nasal sound. To the existence of those vertical surfaces, and consequently to the thickness of that part of my palates which fills up

the fissure in the soft palate and the cavum pharyngo-palatium, I must attach special importance. But for that thickness, the levator palati, when it rises upward, would not remain in contact with the side edges of the obturator, nor would the constrictor pharyngeus be able to effect a sufficient termination if the portion of the obturator nearest to it consisted only of a thin plate."

A great many practitioners, in treating a fissured palate, simply separate the nasal and buccal cavities by a thin plate, thinking that the separation is all that is required. Some even make a great parade of this device, claiming it to be an improvement over any other appliance. A little reflection will show this to be impossible, as we will endeavor to explain before closing this paper. I wish to go back and repeat what Suersen says: "In order to be able to pronounce all letters distinctly, it is accordingly necessary to separate the cavity of the mouth from the cavity of the nose by means of muscular motion. That separation is, under normal conditions, effected on the one hand by the velum palati which strains itself (consequently by the levator and tensor palati)."

It will be noticed that he admits that the levator palati is an important organ of speech, yet he makes no provision for utilizing it as such, and only provides for the superior constrictor muscle coming in contact with the distal surface of his appliance, to shut off the nasal passage. In my opinion, for the patient afflicted with congenital cleft to acquire perfect articulation with such an appliance (even if it be possible), years of application and training of this muscle would be necessary. A little reflection will show that this muscle, besides performing its own function, must be trained to fulfill those of the velum palati, levator palati, and tensor palati. But in an accidental lesion this may be all that is necessary, as the patient, having previously learned to articulate distinctly, and having this deformity come upon him afterwards, the superior constrictor muscle would no doubt be sufficiently developed to perform that function.

Sir Wm. Fergusson, in his report of a dissection made by him of a cleft palate in 1844, states distinctly that the superior constrictor was very full; and he also claimed for that muscle very decided forward action in deglutition. I am of the opinion that his dissection was of an accidental (not a congenital) case, after that development had taken place.

It was in the years 1841 and 1842 that Dr. Stearns made his first artificial velum.

In 1860, Dr. N. W. Kingsley came into the field and took up Dr. Stearns's appliance. Finding it too complicated for the general practitioner to construct, and too expensive when completed for those in



ordinary circumstances, he was led to serious thought in regard to modifying its production; but he still adhered to the same principle of utilizing the levator muscle. Dr. Kingsley says, respecting Dr. Stearns's appliance:

"Two principles were vital to Dr. Stearns's instrument, namely, First, the artificial velum should embrace the levator muscles of the palate, so that it could be lifted by them; and second, that it should bridge the upper pharynx behind the uvula and cut off nasal communication at will."

Dr. Kingsley's modification of Stearns's instrument consisted chiefly in leaving off the triple form and doing away with the central slit, the flap, and the springs. The simplified form consisted of two leaves of soft vulcanized rubber, connected in the median line, the palatal portion running down to the uvula and then bridging across at that point, and the nasal portion reaching across the pharynx. Instead of the appliance being made in sections, so as to slide across each other, as in the Stearns, the bifurcated uvula slides between the two leaves, and the levator muscles of the palate lift it up to meet the pharynx, thus shutting off the nasal passage.

It will be noticed that in this simplified form the Stearns principles are fully carried out, and to Dr. Kingsley that credit is due. His claims to originality are in the simplifying of the Stearns instrument.

Dr. Kingsley says: "An important principle enunciated by Dr. Stearns as essential to the success of all artificial vela for congenital cleft was, that the instrument filling the fissure in the natural palate must be of the nature of a valve under the control of the muscles surrounding it, and so arranged that it could be elevated by them, thus shutting off the nasal passage, as is absolutely essential in the production of certain sounds belonging to articulate language. This principle was carried out by him, first, in the character of the material chosen being of a yielding, elastic nature; and second, in the form being made to embrace the levator muscles and subject to their control."

Dr. Kingsley, in speaking of Suersen's appliance, says:

"First. That of all obturators this is the best form for a congenital fissure; but, while the wearer is enabled to articulate with such an instrument, it is only *after* he has learned articulation with another apparatus.

"Second. That a soft, elastic, artificial velum is much better adapted to the acquirement of articulation than an unyielding, non-elastic substance, but when acquired, an obturator may be substituted.

"Third. That in very rare cases articulation may be acquired with an obturator only; but it is the result of the extra activity of

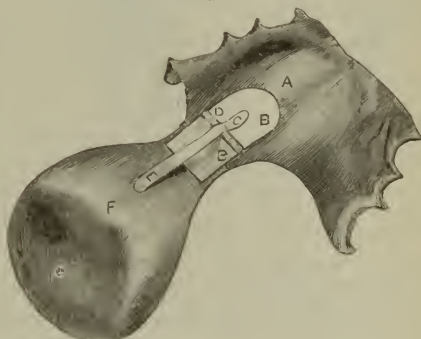
the pharyngeal muscles, while with the elastic velum the levators of the palate contribute largely."

My own experience with soft vulcanized rubber for an artificial velum is, that if it would resist the fluids of the mouth and not go through a process of decay and roll out of shape, in short, if it could be made permanent, it would be all that could be desired. Since this is impossible, I do not hesitate to say that it is a very objectionable material, and I have been led to long and careful meditation regarding it. I have been striving for the past five years to provide an artificial appliance, with hard rubber, carrying out the Stearns principle, whereby I could utilize the levator muscles to control the movement of the appliance, and with which articulation could be learned as well as with the soft rubber.

My studies and experiences have induced me to settle upon the following device, which consists of a gold or hard rubber plate (A, Fig. 1), covering the roof of the mouth, down to the junction of the hard and soft palates. From this point the artificial velum, F, extends back and downward, restoring the symmetry of the palatal surface by bridging across and lying upon the muscles of each side. The distal surface, G, or that portion coming in contact with the pharyngeal wall, is quite broad, and so constructed as to articulate perfectly with this surface, while the constrictor muscle contracts and closes around it on a semicircle. This is the Snensen principle, and the main ideas I take from that appliance.

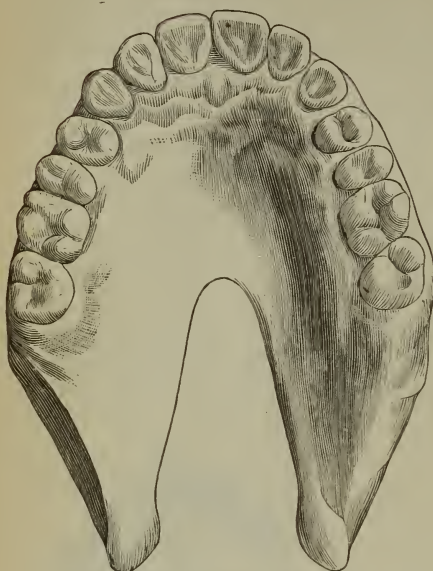
The velum is of polished hard rubber, gold, or platinum, and much resembles a chestnut in form. It is attached to the plate with a hinge-joint, B, B, thus giving free movement at the junction of the hard and soft palates. Fastened to the upper surface of the plate is a delicate, platinized gold spring, C, which bridges across the joint, and, resting on the velum at E with a slight downward pressure, serves to keep the latter in contact with the levator muscles when in action, thus giving perfect control of the appliance. The spring necessarily must be very delicate, so as not to resist the muscular movement. At the junction of the hard and soft palates there is a stop, which prevents any downward pressure upon the muscles when in a relaxed condition. The bulb-like form of the velum (see D, Fig. 4) necessitated a thickness which would

FIG. 1.



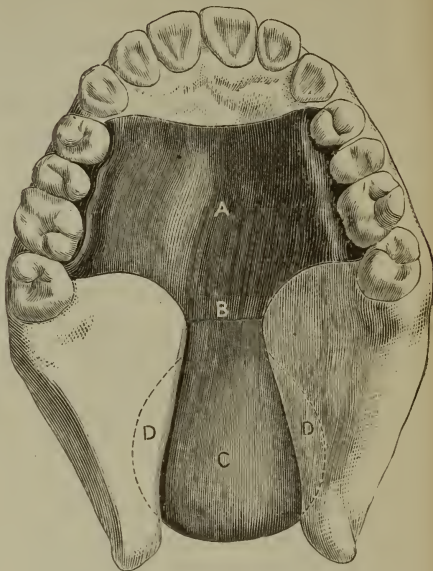
naturally have made it quite heavy, and, as the resultant weight would be a serious objection, I was, of course, desirous of overcom-

FIG. 2.



The cleft, extending a little beyond the soft into the hard palate.

FIG. 3.



Appliance in position: A, the plate; B, the stop, preventing any downward pressure when the muscles are in a relaxed condition; C, the artificial velum; D, D, muscle lying under it, the dotted lines showing the appliance resting on the muscles.

ing the difficulty. A suggestion happily came to my relief in this way: While in a drug-store I accidentally took up a hard rubber

FIG. 4.



The artificial palate thrown up by the muscles, E, E, as in all sounds requiring the closure of the nasal passage; F, the superior constrictor muscle advanced to meet it; G, the tongue, raised, pressing hard against the appliance, as in pronouncing the letter *k* or *g*; A, the plate; B, the hinge-joint and stop; C, the spring resting on the velum.

truss made by a Philadelphia firm, discovering that the pad was



made hollow. I thereupon wrote to the manufacturers, asking them if they would inform me how they prepared the rubber in that way. In their reply I found that the method was quite simple. It is as follows: Take the vulcanite rubber in the soft state and cut the sheets so that when joined together the desired form is given. Then a little water is dropped into the cavity (I found it better to add a little alcohol), the edges are sealed, and the piece vulcanized in the usual way. The steam produced by the water and alcohol inside creates sufficient pressure to keep the walls distended. By this method the appliance that the cuts were taken from which illustrate this article was made so light that it would not sink when put in water.

In treating a case by Kingsley's method I was obliged to use a hinge-joint to bridge over a union by staphyloraphy. I found in that case that the appliance was much better controlled by the surrounding muscles, and saw a much more rapid progress in acquiring articulate speech. This led me to more fully provide for that muscular movement, and I will endeavor to give the reasons why this should be done. As we have before quoted from Suersen, in order to pronounce all letters distinctly it is necessary to separate the cavity of the mouth from that of the nose by muscular action, and to close the nasal passage in pronouncing every letter, except *m* and *n*. This can be demonstrated by holding the nose while endeavoring to pronounce all the letters as plainly as possible.

In studying the mechanism of speech we learn that more than three-fourths of the sounds of articulate language depend upon the integrity of the soft palate for their perfect enunciation. This being the fact, articulation with a rigid obturator must be extremely difficult to acquire. If three-fourths of the sounds depend upon the free movement of the natural palate, it seems to me a sufficient reason why we should provide for that movement in an artificial one.

Dr. Kingsley says, that with a yielding appliance the levators of the palate contribute largely to correct speech. The surrounding muscles have control over my appliance in the following way: The artificial velum bridges across the opening and lies upon the muscles of either side. (See Fig. 3, D, D.) With all sounds requiring the closure of the nasal passage it is thrown up (D, Fig. 4) by the levator muscles, there being no resistance except that of the delicate gold spring, C, which preserves the contact of the velum with the muscles. The thickness of the velum brings its posterior surface in close apposition with the superior constrictor muscle, F, and thereby affords, in the pronunciation of the gutturals, a firmer resistance to the pressure of the tongue, G, than can be obtained with a thin obturator. By the presence of the hinge, B, the above movements are rendered so free and easy that there is no tendency

to any displacement of the plate, such as occurs with a rigid appliance. If a nasal sound immediately follows a guttural, the descent of the velum is rendered certain and accelerated by the pressure of the spring above.

FIG. 5.



The muscles relaxed, the appliance descended, thus giving a free passage for nasal sounds and respiration.

To accomplish the above with a material that would be permanent was a problem very difficult of solution. Of course, it is impossible to give to a piece of mechanism muscular power, but it should be made movable so as to be acted upon by, and be under perfect control of, the muscles surrounding it.

I claim the following advantages for my appliance:

First. That it is made of a permanent material.

Second. That articulation can be learned with it more readily than with any other appliance.

Third. That it is much easier to make. For a soft rubber appliance perfect models of both the hard and soft palates are required, as well as of the nasal portion of the soft palate; also metal molds are essential to vulcanize each case.

Thus the cotton-rolls of the mediæval surgeons are replaced with artificial organs of precision, working upon physiological principles. The ingenious appliances of our distinguished fellow-professionals, Suersen, Stearns, and Kingsley, whose scientific attainments and researches have reflected such lustre upon the art of dental prosthesis, have excited my admiration as I have studied their complex operations, and if I have been enabled to extend their usefulness, and increase their value by substituting an imperishable material for the less excellent substances now in general use, I shall consider that the years of study I have given to this remote and rarely-considered problem of science have not been altogether without their reward.

## REGULATION OF TEETH MADE EASY BY THE POSITIVE SYSTEM.

BY J. N. FARRAR, M.D., D.D.S., NEW YORK.

(Continued from page 611, vol. xxi.)

## No. XII.

## DRAG-SCREWS, STRINGS, AND WIRE.

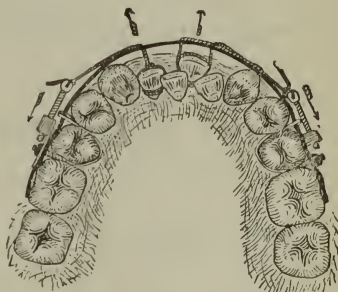
THERE are several ways and means of forcing teeth from within outwardly. Where only one or two require movement it may sometimes be accomplished comparatively easily by the use of the inclined plane, or, perhaps, by the old and well-known plan of a bridge over the gap or gaps between the adjacent teeth, made by a strip or plate secured outside of the dental arch, to which the instanding teeth may be firmly lashed and tied with strings, renewed and retightened every day. (Fig. 4, page 16, DENTAL COSMOS for January, 1876.)

Instead of this frequent changing of strings, my favorite plan is to use the screw and string combined, and which are connected by some form of swivel, as illustrated in paper No. IX. (DENTAL COSMOS for April, 1879.) Having firmly secured to the teeth a strip of plate, as above described, to serve as anchorage and fulcrum, the string attached to the tooth to be moved is passed through a hole or notch in the strip of plate; thence carried back, it is secured to a little tension-screw operating in a nut soldered or otherwise attached to some distant portion of the same fixture.

Fig. 63 illustrates the appearance of such a device in position to force out the lower incisor teeth. This is simply a strip of gold or platinum plate secured to the bicuspids teeth by strings or by metallic bands and screws, as shown, all of which act as an anchorage and pulley-fulcrum for the tension-strings. Having properly secured a string around one or more incisor teeth, they are passed through holes in the front portion of the metallic arch or bridge; thence backward, and tied to the drag-screws, which play in nuts attached near the posterior portions of the fixture. By turning the screws, the strings draw upon the teeth whenever and to any degree desired. To avoid confusion, the strings in this figure are represented as tied to the screw-heads, but in practice it is best, in order to avoid kinking by twisting, to use a swivel. The simplest and one of the best is made by bending a piece of plate at a right angle, and drilling a hole in each end for the string and screw.

While there are cases where more than one tooth can be easily

FIG. 63.



Regulation of the lower incisor teeth by application of drag-screws and strings.

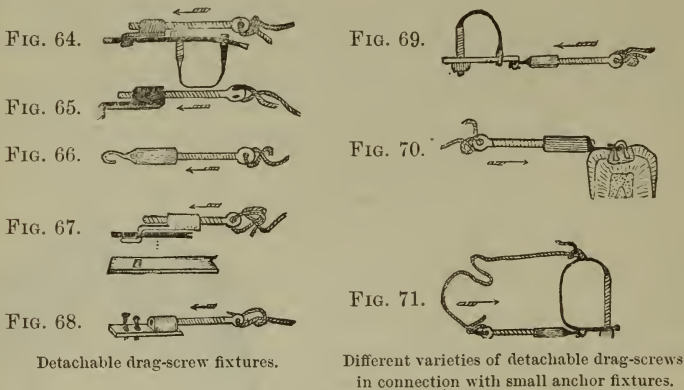


moved (by one string) at the same time, as a rule, *it is better and more practicable to move but one at a time*; but when there is more than one string, as is shown in Fig. 63, each may sometimes be tightened to advantage at the same time, or, perhaps better, alternately. When fixtures of this variety are properly made and firmly secured in position, the subsequent portion of the work of moving the teeth is very simple, and can be managed principally by the patient.

Whenever it is practicable and there are no angles between the tooth to be moved and the screw, strong, yet delicate platinum wire is better than a string, as with it there will be no danger of stretching or slipping of knots.

Instead of soldering the nuts to the anchor fixture, the same end can often be more conveniently attained by detachable, ready-at-hand screws and nuts, which may be connected in one minute by a hook (Figs. 64, 65, 66) or by an angular extremity placed through a hole made in the strip of plate. (Fig. 67.)

Figs. 64 to 68, inclusive, illustrate a few simple, ready-made adjustable drag-screws, which are often practicable, especially with children.



Detachable drag-screw fixtures.

Different varieties of detachable drag-screws in connection with small anchor fixtures.

Fig. 68 represents a form of detachable drag apparatus which is easily attached to any rubber or metal fixture by means of platinum rivets, made of pins from artificial teeth, or by a nut, as shown in Fig. 63.

While some cases require strongly built anchor fixtures, like that shown in Fig. 63, there are those which can be equally well treated by the use of the ready-made devices, which are less cumbersome, and which may be easily adjusted in a few minutes. In variety of structure these fixtures may be very numerous.

Figs. 69, 70, 71, show their connection with different varieties of anchorages, including a platinum-wire staple set with amalgam in a cavity in a tooth.

(To be continued.)

**"PLASTICS AND PLASTIC FILLINGS"—REVIEW OF THE WORK  
OF PROFESSOR J. FOSTER FLAGG.**

BY JAMES TRUMAN, D.D.S., PHILADELPHIA, PA.

THE volume just issued from the press of Presley Blakiston, of this city, is the latest word from the "New-Departure Corps." As the author is the foremost teacher of the theories that have emanated from this sphere of dental teaching, the present work must be regarded with more than ordinary interest by the entire body of the profession. To review a book of this kind in the usual way is clearly inadmissible. Whether we regard the theories promulgated as true or not, it remains a fact that a certain number of prominent men in the profession have thrown down the gauntlet to the majority and have boldly asserted that the teaching of the past is radically wrong. This aims at revolution, and revolutions cannot be put down with a sneer, nor can they be crushed by persecution. If the majority have not solid arguments, based on truth and experience, to oppose to these bold assaults, then the practices of the past, the teachings of the fathers, deserve to be condemned by all honest-thinking minds. Every courageous thinker must admire the bravery of scepticism, however much he may deplore the results. Through it and through it alone the world has advanced. It is ever the new thought questioning the old, and whether its tendency is to good or evil, it still remains the motive force of the ages,—the eternal interrogation that marks the path of progress.

In this volume we have copious argument for a change of practice. Here is precedent defied and authority cast to the four winds. Here is the old in practice brought to the front, re-clothed, and made to serve the purpose of a new revelation; and here we have the few cutting stone by stone from the building erected by the many. It is therefore not possible, nor is it advisable, to do other than accept the issue and approve the teachings on their merits or reject them on their demerits. Any other course is not only undignified, but is a tacit acknowledgment of weakness. It is therefore proposed to take a survey in as brief a manner as the subject will permit, criticism where criticism seems eminently necessary, and indorse where indorsement seems proper.

The author opens on the title-page with a monogram and the motto: "Truth without fear and without favor," and then dedicates the work "To the New-Departure Corps," and adds: "This monograph is inscribed as a testimonial of individual indebtedness, of sincere respect, and of kind regard."

The volume begins with a short preface, explaining why the author concluded to publish in this form, and an "Introductory" follows,

in which he reviews the different and antagonistic relations of the two modes of thought,—that of the “gold-worker” and that of the “worker in plastics.” The statements here are positive, and, in many respects, unworthy of the author. They are made up largely of assertion, in which he assumes to think for his opponents, and in doing so, utterly misrepresents them. This is peculiarly apparent in the following quotation, the italics his own:

“*The minutiae of ‘plastics’ is an unknown thing to the gold-worker. It consists of special knowledge in regard to much which is only known to him as a mass of vague generalities, while the ‘ways and means’ of the worker in plastics are viewed askance by the gold-worker as a series of shiftless devices, promotive of slovenly results.*”

That this assertion is untrue, need hardly be stated. It egotistically assumes a superiority of knowledge which no dentist of average intelligence would for a moment admit. It implies that the “gold-worker” confines himself exclusively to that one material,—a position occupied by no one within the knowledge of the writer. It assumes superior information on the part of the plastic workers, superior means for investigation, and superior intelligence to analyze results,—conclusions that cannot for a moment be entertained. The same idea runs through the entire volume, and permeates every argument. It is assertion followed by assertion, with only occasional attempts at citation of proof. This, perhaps, ought to be expected from an extremist, but it leads to the suspicion that the actuating motive is not the elimination of truth, but rather a determination to carry a point at all hazards.

The first article is a *résumé* of the reasons that led him gradually to undertake the work of a “systematic development of plastic filling.” He remarks, “It has been to me a ‘labor of love’ . . . until, at the close of the ninth year, I found myself filling all cavities in teeth *below medium in structure* with plastic materials. By this time the demands for services had reached a point which permitted of *selection of cases*, upon my part, and I resolved to confine my work thenceforth as much as possible to the *saving of soft teeth.*”

It will be seen by this quotation that he claims to treat teeth only “below medium in structure.” If the whole aim and tendency of the teachings of the book were confined to this, there possibly need be no serious criticism; but it is very evident, from careful reading, that the whole tenor of the argument is towards an entire abandonment of gold as a filling material, and with it all the teachings of the past. The motto of Professor H. S. Chase, which he emphatically indorses, that “In proportion as teeth need saving, gold is the worst material to use,” may be made to cover all defects. In the opinion of the reviewer, words could hardly be strung together



that would convey less intelligence. All teeth affected by decay need saving, and, therefore, in proportion as they need this, some other material beside gold must be used, or, in other words, the value of gold decreases in exact ratio to the destruction! If this is the meaning, where is the line to be drawn? If gold is good for a pin-point cavity, it is not good for a pin-head cavity, and therefore some other material must be resorted to! No other conclusion can be deduced from this somewhat celebrated motto. The legitimate result of this kind of reasoning is the abandonment of gold altogether, and this position the author accepts, if understood by the writer.

The second and third articles are a history of amalgam in the profession, and do not call for special notice. The fourth enters into the reasons that induced the author to join with Messrs. Du Bois and Eckfeldt, of the Philadelphia Mint, in the making of analyses of the various alloys. "The incentive to them was the probability of eventually arriving at an excellent alloy which they could manufacture. The incentive to me was the evident possibility of so directing experimentation as to secure promptly a good result, based upon some reliable data." The outcome of this work was the conclusion that "the analyses given in the paper compiled by Professor Hitchcock, and presented by Professor T. H. Chandler at the New York 'Odontological' meeting of December, 1874, were almost entirely unreliable, and eminently calculated to mislead inquirers." He then follows this with examples in which there is evidently a marked disagreement, which would seem to require some explanation from the parties interested.

Article fifth is devoted to the "Attributes of Metals used for Amalgam Alloys," and to this he appends a note, denying that he has any pecuniary interest in the sale of the "Standard alloy," but had expended his "third of nearly seven hundred dollars," and "would have willingly contributed hundreds of dollars more, had it been needed, for the satisfaction which I have enjoyed in the possession of that solid substratum of information in regard to dental alloys, . . . which I think I could not have as well obtained from any other source."

In the paragraphs devoted to copper occurs the following, p. 50: "My record of pulp-saving—noted in each case after *five years* of trial—is very significant in its connection with the presence of a portion of copper; for while I do not presume to say that it is as yet proven beyond question that pulps do maintain their vitality better under amalgam fillings which contain copper than under those which do not, I must nevertheless admit that observation has seemed to point so conclusively in this direction that I should,

in my practice, permit, with the exception of tin, no metal filling which did not contain copper to approach a pulp." He has very little faith in cadmium, even when introduced in very minute quantities, and when introduced in amalgams in large quantities it is very injurious, and adds, "I have but one opinion, and that is that they should be *denounced with the utmost severity.*"

Under the head of "*Platinum*," he remarks, after discussing its supposed merits: "So far as is *proven*, the value of platinum seems to be *just equal with that of tin*. Every alloy which we made or experimented with that had, *in place of* certain proportions of platinum, *the same equivalents of tin*, set the same, shrank the same, gave the same color-test, had the same edge strength, and, with the exception of being perhaps a *little less* plastic and a *little less* tough, worked the same, and, so far as could be positively demonstrated, were *practically the same.*"

"My conclusion is, therefore, that *except in name (!)* the metal, platinum, is *valueless* as a component of amalgam alloys for filling teeth."

This chapter must be regarded as one of the most valuable in the book, as it is evidently based on extensive experimentation on the part of himself and colleagues. The conclusions are clearly stated, and are worthy of careful consideration. They prove the necessity of just such work, and if no other benefit is derived from the author's labors, they ought to rouse the members of the profession to the folly of accepting all kinds of material upon the simple word of a dealer or manufacturer. We decry quackery, and are ourselves the most wretched of quacks, inasmuch as we are daily using materials of whose constituents we are mainly ignorant, and of their effects, for good or ill on the general system, we have not the slightest scintilla of knowledge. This is a mortifying confession, but its truth must be apparent to all.

The author next proceeds to the consideration of the making of amalgam alloys, and after quoting the process used by the Professor of Operative Dentistry, University of Pennsylvania, who begins the process by melting the silver first, adding platinum in very small pieces, next the gold, and lastly the tin, he gives his as follows: "Having perfectly fused the borax in it" (the Hessian crucible) "*the tin is melted first*, requiring but a low temperature, and after it is melted the granulated silver is added. It is really remarkable, when the high fusing-point of silver is considered, with what facility this metal is taken up by the molten tin. These two metals are thoroughly stirred together with an iron rod or clay pipe-stem, of small size and suitable length, and when completely incorporated, the copper—small pieces of wire—is added. This, like the silver, not-

withstanding its fusing-point of almost 2000°, is soon melted, and may be equally homogeneously mixed. Lastly, the gold is added, melted, and all is thoroughly stirred together with the iron rod or pipe-stem. When perfectly melted and mixed, the fused mass should be quickly poured into a broad, open, flat, shallow matrix, made of iron or soap-stone; this favors prompt cooling, and thus secures the greatest uniformity of distribution to the components."

He has no faith in the generally-received opinion that "filings" should be as fresh as possible, for he says, "Among all the many errors which have obtained in connection with alloys and with amalgam, there is probably no other more decided than this. There is no alloy made that does not work better and make better results after it has been cut for several weeks than can possibly be the case where it is 'fresh.'"

In article seventh he considers the "Various Tests for Amalgam." (1) "Quality" test. (2) "Shrinkage" test. (3) "Setting" test. (4) "Color" test. (5) "Edge-strength" test. (6) The "Tooth-Conserving" test. He remarks: "The quality of an amalgam depends upon the quality of the alloy with which it is made, the quantity of mercury with which it is mixed, and the method by which the filings are incorporated with the mercury. The *quality* of the mercury has no appreciable influence upon amalgam, . . . and the necessity for having it 'double distilled'—a quality thought to be something finer than is usually sold—is merely ideal. I 'double distill' by pouring from my ten-pound bottle of 'battery mercury' into my boxwood mercury-holder."

In considering "shrinkage measurements" he accepts, with modifications, the index amalgam micrometer of Professor Hitchcock, but finds fault with the work done with it, as presented at the New York meeting, in the following language: "The whole series of experiments are so loosely done; so completely inharmonious in their relation, the one to the other; so *impossible of production*, if done with an instrument of the least pretensions to accuracy, in the hands of an experimenter of even limited experience, that no value whatever, as bases for amalgam-alloy work, can attach to them." He prefers for this purpose to use "the two-inch matrix, micrometric, and direct microscopic measurement." On page 76 he gives an illustration of an instrument adapted to test "edge strength," and also the relative rate of "setting" of amalgam. It would seem to be best adapted to indicate the "crush"-point and not at all the strength of edge.

In the next article, the eighth, on "Preparation of Cavities," he gives his idea of how a cavity should be arranged. "In preparing for amalgam, the governing principles result in the making of



cavities without angles; with no flush walls; few, if any, pits; with cavity-shape *decidedly larger inside than out*; with concave undercuts and largely overhanging edges; in short, he aims to make his cavity a *concavity* to the extent of his ability. Why is this? Because he recognizes the spheroiding tendency of his material; he recognizes that it 'draws' from angles and from straight walls; he wants to shape it and to place it *as it wants to stay*. *Bulging* and *crevicing* are the bugbears of the amalgam-filler."

He argues at considerable length the advisability of at times leaving a portion of the decay in a tooth, a necessity which, it may be presumed, no intelligent practitioner will combat.

In article ninth, on the "Making of Amalgam," we find the same positiveness of statement before alluded to, that destroys confidence in the position taken. He writes: "The *overheating* by combining with too much mercury melts out certain of the ingredients in unknown quantities. If the alloy is a two-metal alloy, combined without regard to test results, of course comparatively little injury will ensue; the material not being good cannot be made very much less good; but, in a fine alloy, compounded with great care and in such proportions as give excellent test results, the withdrawal of any proportion of any of its ingredients is presumptively detrimental, and the withdrawal of indefinite quantities of all its ingredients is, as I have said, injurious in degree just in proportion to its original excellence." How does the author know that such results take place? Where are the experiments to demonstrate it? The reader will search in vain, and must rest content with the assertion. To overcome this supposed danger he recommends the preparation of amalgam by weight. "This does not direct that the weighing shall be by *weight*, but by proportions. . . . It will require for *first* or *lowest grade* of two-metal alloys—*tin* and *silver*—about 37 to 39 *per cent.* of mercury; for *second grade*—*tin*, *silver*, and *gold*—about 41 to 43 *per cent.*; for *third grade*—*silver*, *tin*, and *copper*—about 46 to 48 *per cent.*; for *fourth grade*—*silver*, *tin*, *copper*, and *gold*, or *tin*, *silver*, *gold*, and *zinc*—about 48 to 50 *per cent.* of mercury."

For mixing he prefers a glass mortar to one of porcelain, but the glazed surface should be removed both from the inside of the mortar and from the bulb of the pestle. The final treatment is by kneading in the palm of the hand. The next article is devoted to instruments for the insertion of amalgam fillings. As these are but modifications of the ball-burnisher and Lord scalers there is little to be said, further than that they contain no points of novelty. Instruments for conveniently carrying amalgam to the cavity are also illustrated, but these are to be found in stock at the various dental depots.

We now come to the eleventh article, on "The Insertion of Amal-

gam Fillings," and as this is the crowning point of all the labor that has preceded it, it is proper it should receive candid consideration. He repudiates entirely the idea "that the profession of dentistry bases its capability for rendering service to suffering humanity most largely upon the manipulative skill of its members," but rather "upon the scientific attainments of its practitioners." This, within certain limits, is true, and yet it is equally true, that the man with but little scientific ability may be a very safe operator, one, in fact, to be trusted in all ordinary operations, while he who is thoroughly scientific, *without practical ability*, is utterly worthless, and should never be trusted under any circumstances.

He advocates an increased use of silver in the alloy, from the fact that the old-coin silver amalgam fillings have proved their value for "tooth-conservation." "Sixty silver, thirty-five tin, five copper" he regards as an excellent "submarine" filling, or, in other words, it can be packed with facility under the fluids of the mouth, though he prefers to wash out the cavity with "pure water, in which is dissolved sufficient carbonate of soda to render it slightly alkaline." He advocates dryness, however, for "just in proportion to the absolute dryness of the cavity and to the maintenance of dryness during the thirty minutes required for 'setting,' other things being equal, will be the perfection and durability of the filling."

The "second" kind of amalgam he uses is that "employed for usual work, submarine, one part; contour, two parts." "All alloys based upon the sixty silver, forty tin, modified by additions of gold and copper, would naturally come into this class." The third kind is that "especially intended for contouring, approximately, silver, fifty-eight; tin, thirty-seven; gold, five." His opinion is "that the 'Standard' alloy offers the nearest approximation to the average of all requirements in usual and contour work that has yet been attained." "The fourth kind—contour, one part; facing, two parts—is that used for filling soft front teeth which have been disked out or separated." The fifth kind—facing, approximately, tin, fifty odd; silver, thirty odd; gold, five to seven; zinc, two to four—is that which at present is least liable to discoloration. Having given the kinds, he enters at length into the modes of insertion; but as this does not differ materially from accepted modes it is unnecessary to enter into it *in extenso*.

He objects to "*rubbing in*" amalgam in the cavity, preferring a gentle tap, and regards the malletting-in as "really objectionable." The last piece to be added to the filling he makes dense by pressing in a chamois-skin to a hard wafer. This he regards as adding to "edge strength, density, and whiteness of filling." After the filling is "wafered," it "should be shaped." For this purpose he uses a

"piece of soft pine stick." After smoothing, it is "allowed to harden for ten or fifteen minutes; it should then be burnished and smoothed again with the stick, then allowed to harden for another ten minutes, when it should be finally burnished and *finished white* with the piece of stick, using, if necessary, a little very finely-levigated pumice. The stick should be passed over the face of the filling, *up or down*, and then across the filling." The object of this is to "leave the lines of finish so that the light will strike upon, presenting parallel faces, and thus gives to the filling a much whiter appearance." He disapproves of burnishing fillings after they "have assumed a partial hardness."

This is the last word the "Corps of New Departurists" has to say in regard to the finishing of amalgam fillings. The importance of edge strength is so repeatedly alluded to that one is naturally led to inquire, what does our author mean by this? He has, it is true, a very definite idea of what he wishes to secure, and defines it clearly enough, but when we refer to the instrument used for testing this, we find he brings a force to bear that crushes the entire filling. In his mode of preparing cavities he has but little need of an edge, as that word is generally understood; and as his amalgams are supposed to have a minimum amount of shrinkage, why this constant iteration of the word? The secret may perhaps be found in the fact of his failure to finish amalgam fillings properly, and he therefore desires an edge, under partial hardness, of an unusually compact character; for, as he well understands, unless this is secured, his filling is just to that extent imperfect. It is a disappointment to find the head and front of amalgam advocates—one to whom all classes of operators are looking for the best modes of working this material—absolutely behind all respectable operators in this simple matter. It is safe to assert that no man, however skilled he may be, or in what manner he works his amalgam, can finish a filling in one sitting as it should be done, and why? The plasticity forbids it. He "burnishes and rubs with a stick," and by so doing causes an overlapping of the edge in every tooth so treated. This may possibly be denied, but it requires but a simple experiment and the subsequent examination with a glass of sufficient power to prove it. Now what results from this *serrated edge* being left? The secretions become deposited therein, change takes place, acidity supervenes, and the destruction of the tissue goes on. This, in the judgment of the writer, is all there is in the fine-spun theories of "good edge" or "bad edge." An amalgam filling allowed to remain for several days for the hardening process, and *then finished* with the utmost care, has all the qualities necessary for a good filling, whether it be made from Townsend's, Walker's or Standard



amalgam. Any other opinion than this is at variance with the experience of the best and most skillful dentists of this country and Europe.

Throughout the entire work there is a notable absence of anything that would lead the reader to infer that the dentist had anything to do beyond crown-cavity work; but in the article devoted to "General Considerations" of amalgam, allusion is made to the mode the author adopts in filling roots, he says, "The canals having been filled with glycerin, into which are passed taper-twisted canal dressings of cotton-wool dipped in oil of cloves, these are covered with gutta-percha in such manner as that the floor of the *pulp-cavity* is lined with this, and the filling is shaped into a hemisphere. Around this, in undercut grooves, is anchored the amalgam filling. . . . An entrance is now made by careful, gentle drilling or cutting through the filling into the gutta-percha. This entrance, if upon an articulating surface, is then almost entirely filled with gutta-percha, over which is placed a covering of amalgam. If it is upon any surface not exposed to attrition, it is, of course, completely filled with gutta-percha." If the relief route is closed with amalgam it should always be done with "facing" amalgam, as this will leave a distinct demarkation, indicative of position of "tap." This is the best thing the "New-Departure Corps" have to offer in the person of their leader,—"glycerin," "cotton-wool," "oil of cloves," and a "tap"! It is hardly necessary to say that such an operation is to the last degree abominable practice, and must of necessity fail in its object. No one knows better than the author that the pulp-canals become, to all intents and purposes, sewers for the collection of effete matter originally contained in the tubuli. This collection generates noxious and irritating gases, which sooner or later act detrimentally on the periodontium. To prevent this, the operation of filling the canals *solidly* was adopted nearly a half century ago, and no operation in the whole series we have been called upon to perform has had a tithe of the success this has; indeed, it is doubtful whether a root properly filled *ever did or ever could* occasion trouble, provided there had been no previous inflammation of the periosteum. On the other hand, the antiseptic quality of the oil of cloves is soon lost by absorption, and then the cotton becomes a concentration of nastiness. When this takes place the "tap-hole" comes into play. If this is the highest type of a skilled "New Departurist," we may well be thankful that the number is as yet limited.

In this same article he acknowledges that "it must be viewed as unfortunate that we have not yet attained any non-discoloring amalgam," and, he might have added, we never will so long as the bad practice of finishing an amalgam filling at one sitting is persisted

in. To this may be ascribed the largest percentage of discoloration. With care in this respect, this difficulty, so much lamented by the author, is reduced to a minimum.

He advocates when gold clasps come in contact with amalgam fillings to coat "the inside of the clasps with a mercurial covering, by rubbing upon it a small portion of amalgam." This prevents the otherwise disagreeable galvanic action of the two metals. If this fails, and other "plastics" are not available, he recommends, "if clasping is a necessity or a very great comfort, the *devitalization of the pulp of the clasp-tooth*." The italics are the reviewer's. This statement carries its own condemnation.

The author repudiates the idea of pytalism connected with the too free use of amalgam, and says: "He has never *seen one case* of mercurial pytalism, mercurial periostitis, mercurial necrosis, or the slightest symptoms which could reasonably be ascribed to mercurial action."

The grafting of crowns by the use of amalgam he considers at length—natural, or crowns broken off, artificial, his own, Bonwill's and Gates's—and concludes the article by describing the mode he adopts to build up detached roots, which he regards "as the great dividing line between gold and plastic dentistry."

The thirteenth article is devoted to "Gutta-Percha." In this will be found nothing especially new, but it is valuable, as it gives a very clear statement of the method adopted for testing various samples for "heat test," and also the mode of preparation of the various kinds used. His faith in this material for fillings is "restricted, first, to large cavities approaching the pulps, and having thin, frail walls, located upon the buccal faces of molars and bicuspid, either superior or inferior; second, to circumscribed cavities upon the mesial or distal faces of incisors, cuspids, and bicuspid, having reasonably thick walls labially and buccally. . . . In soft teeth all these requirements are but infrequently found, and thus it is that at the present day the strictly legitimate use of gutta-percha *alone* as a filling material is almost entirely confined to *large cavities* having thin, frail walls located upon the buccal faces of molars.

Article fourteenth considers "Oxychloride of Zinc," which he regards as worthless as a filling material. His idea is summed up in the following paragraph: "It is unquestionably true that some of the oxychlorides are better than others, for they are more thoroughly compounded and more carefully prepared, but it, nevertheless, remains that the best of them is entirely unreliable, and no one of them is deserving of rank as a *filling material*." This statement is only in part true. The best oxychlorides are good fillings under *certain conditions*,—that is, where marked alkalinity of the secre-

tions exists. They fail at the cervical wall. Why? Because there is, in the majority of mouths, a marked acid reaction at that point, and acids rapidly destroy this material. The secretions of the mouth are usually neutral, and neutral solutions change rapidly into acid solutions, hence this great destruction, and hence the great liability to destruction of the margins of all fillings at that point. The compatibility or incompatibility of the material with tooth-bone has nothing to do with it, as has been abundantly shown in the able paper of Dr. Miller, in the February (1881) number DENTAL COSMOS.

Now, why does not our author make use of combination fillings? He has all sorts of amalgams—submarine, facing, contour, etc.—for that kind of work, but fails to suggest a plan made use of by some of the gold-workers and found very effectual. It might be suggested that a layer of gutta-percha at the cervical edge, capped by a filling of oxychloride, would meet all the requirements of a good and lasting filling, and why? The gutta-percha is not acted upon by the acid secretions, nor is the oxychloride usually by the alkaline or to any very great extent by the neutral condition. The zinc phosphates give an acid reaction, and may be used at the cervical edge for the same purpose and for the same reason. No intelligent practitioner can ordinarily depend upon either one of the two last named, exclusively, in certain teeth. He must combine if he would meet all conditions. The zinc phosphates fail in the mouth because they are acted upon by the alkaline secretions, hence these must be carefully observed. Our author recognizes the truth of this, page 158, where, in a paragraph carefully italicised, he enunciates the same principle, but fails to apply it to this material. He says: "*The idea is ever tacitly accepted that a cavity of decay must be filled with ONE MATERIAL, which shall combine all the varied attributes needed for success, totally ignoring the palpably-presented fact that materials which possess certain tooth-saving attributes and are deficient in others, can be utilized IN THEIR PROPER PLACES, while these, again, can be protected by other materials which, though deficient in essentials possessed by the former, are, in a wonderful degree, possessed of the very essentials which in these have been found wanting.*"

As an illustration of this principle he makes use of oxychloride, principally as a "lining" of fillings, especially those of amalgam.

He devotes the next two articles to "Oxysulphate of Zinc" and "Zinc Phosphates." He recommends heating the crystals of the latter in a spoon as wanted. This is, perhaps, as convenient as any way, but a small homœopathic bottle will be found equally as convenient in heating, and has the advantage of being always ready.

Article eighteenth is confined to "Technicalities," in which the definitions of the various terms he makes use of are clearly stated.



Under one head, that of "Whitening," he says, "In plastic dentistry the 'bleaching' is ignored as a detrimental and non-compensating process, and consequently the word has become obsolete." This is rather a remarkable admission, and tends to show, as does the paragraph on filling canals, that anything which aims at a higher esthetic culture or practice is wholly ignored by this system.

While there is much in this volume of real value, and while it should be carefully read and pondered upon by every dentist in the world, it must be regretfully said that its general tendency is corrupting. As a special plea it will find no favor with those who know, through an experience of three or four decades, that gold still maintains its supremacy, and will still continue to be used for the largest number of teeth. But while they know this, they are still capable of intelligently discriminating when to use it and where to use other materials. To such this work will only be an incentive to greater excellence. But, on the other hand, it is to be feared it will be taken as authority by a class, already too large, who, without skill or conscience, are only too ready to adopt anything coming with a show of authority. While this is to be justly feared, it nevertheless must be acknowledged that the vigorous assaults of these iconoclasts have led to a general review of the whole subject; and it is to be hoped that, out of this fire of discussion, truth will be established. The true basis of practice will undoubtedly be found in a mode that will have nothing to do with extremes on either hand, but will adopt that which leads to the accomplishment of the greatest good to the greatest number, and which will recognize the true dentist as one who uses the means that will most effectually accomplish the desired object,—the preservation of the teeth.

### PRIMAL CAUSE OF DENTAL CARIES.

BY H. GERHART, D.D.S., LEWISBURG, PA.

(Read before the Pennsylvania State Dental Society, July, 1880.)

THE title of this short paper is perhaps a misnomer, as it treats not so much of the active cause of dental caries, nor of the process of which caries is the product, as it does of that which makes caries possible, or opens the door to the agents which are factors in the process of that retrogressive metamorphosis which we call caries.

There are two generally-accepted physiological ideas which we will thus formulate:

1. The normal development or growth of any organ is in a great measure dependent upon its actual performance of the functions for which it was designed; and

2. Waste consists in the superannuation, death, and disintegration of individual cells, whose atoms are then taken up by circulatory currents to the excretory organs, and by them evicted from the system.

To these we may add—

3. The restoration of waste, or the birth of new cells to occupy the place of those eliminated as above stated, is as much dependent on the due performance by the organ implicated of its natural work as is the original development of that organ.

From the foregoing we may legitimately draw the conclusion that, for the birth of cells there is required an adequate degree of excitation in development and restoration of waste, this being furnished by the performance of function by the organ.

When waste is not restored, the organ, if of soft tissue, is diminished in size or volume, and we call this result atrophy. If a muscle be subjected to continued and extraordinary exercise, there is an accretion of cells or tissue and the result is a healthy hypertrophy.

A tooth differs from other organs in that it does not develop by growing in size or extending its borders, but by building itself up internally towards its center, and, by the appropriation of calcific elements, indurating and strengthening itself.

As in development a tooth does not increase in size or volume, so in the non-restoration of its waste or in its atrophy it does not diminish in volume, nor in its healthy hypertrophy does it increase in volume, but does in atrophy diminish in density, and in hypertrophy increase in density.

There are some who do not believe that the teeth are subject to this process of waste as are other organs; but at this day no one denies that there is some sort of circulation in the structure of a tooth, at least that there is a current into it; and if into, why not out of, a tooth?

The idea is, however, daily gaining ground that there is life and circulation in even the hardest enamel; that there is change is conceded, and this change is by no one claimed to be molecular. Can it be anything else than physiological? There are, indeed, some transcendentalists who affect to believe that wherever there is molecular change there is life.

I make the proposition, as being in theory in accord with the foregoing, that the primal cause of dental caries in this country is that the teeth are not required to perform a sufficient amount of mastication, thus preventing their proper development and the restoration of their waste, thereby throwing open the doors to the influence of external agents.

Accepting this as the theory, let us see what there is of experi-

mental verification, and this entirely from personal observation. My attention was first drawn to this class of facts several years ago, while making some observations on the effects of tobacco-chewing on the teeth. Other things being equal, chewers of tobacco as a class suffer less from dental caries than those not chewing tobacco; although the use of tobacco acts on the teeth in other and more patent ways, the dynamic influence is the most potent.

In a family of five children whose parents have good teeth,—much above the average,—the three eldest, whose diet has required somewhat more than the average of mastication, have good and dense teeth. The mother, having great faith in bread and milk, insisted on a cow, and for twelve years from their infancy the two youngest children lived mainly on bread broken into milk. The result was in the main good health for the two boys, but lamentably inferior and sensitive teeth. Some years ago, by my advice, these boys were put on harder fare, with special instruction as to mastication, and there has been most manifest improvement in their teeth.

Some months ago a young woman of nineteen years was sent to me for an examination of her teeth. A glance demonstrated that for years these teeth had seen no service. With few exceptions they were carious, and all had a peculiar cloudiness, which is almost invariably seen in unnourished teeth of young subjects. Inquiry brought out the fact that for about seven years these teeth had done no work; everything not plastic was soaked before eating, or bolted whole. As you may suppose, dyspepsia supervened. This being a case of that passive kind of firmness which indicates not a strong will, but a strong "won't," advice was useless, and the teeth are doomed.

Eight years ago a young lady of fifteen or sixteen came under my hands with a very fine set of teeth, dense, yellowish, and compactly shaped. Although she bestowed great care on her teeth, I observed latterly that there was an increasing rapidity in the progress of decay and increasing sensitiveness, with diminished density—in other words, a steady retrogression. I advised a diet requiring considerable mastication, and was surprised to learn that for a number of years, on account of a constriction, deglutition had been possible only with plastic or fluid food.

Many years ago I obtained from an Indian cemetery an upper maxillary with every tooth in position and intact. On the bicuspids and molars every protuberance had been worn level, and on all the approximal curves broad facets had been worn. When you remember the slight motion the adjacent teeth have on each other, you can imagine the amount of mastication these teeth must have done.



Instances might be cited without number; indeed, I might give you personal experience of carving at my own table, and masticating the tail of the sirloin-steak for thirty years with salutary effect, but I spare you. I think, gentlemen, it will be found that the most profound investigation and the closest observation will bring us ultimately to this basal fact,—that the primal cause of dental decadence in this country is and has been the failure in the performance of function, or their natural work, by these organs. Whether this failure arises from the plastic or semiplastic condition to which so much of our food is reduced by cookery, or from the reprehensible habit of bolting our food, because of American haste, the result is the same.

We all know that the pride of our cooks is that their dishes shall melt in the mouth, and I have seen the crew of an express train on one of our trunk lines dispatch a substantial supper in waiting for them at a four-minute station.

If there is truth in the foregoing, our duty as dentists and professed benefactors of our race is obvious.

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## PROCEEDINGS OF DENTAL SOCIETIES.

### NEW YORK ODONTOLOGICAL SOCIETY.

(Continued from page 145.)

DR. EDWARD S. NILES, of Boston, then read a paper on "Odontolithus influenced by Calcic and Phosphatic Diathesis."\*

#### *Discussion.*

Dr. Hill. I should like to ask Dr. Niles what treatment he adopts in such cases as he describes?

Dr. Niles. With my limited experience in practice, and not being connected with an infirmary-practice where I could have had the privilege of demonstrating the advantage of any course of procedure, it is with delicacy that I suggest any treatment to a society of dentists like this. Yet familiarity with the chemistry of the deposit and the physiology and pathology of the parts, has enabled me to suggest treatment which, theoretically, must be more effectual than that which is applied at the present time.

It is evident that the first step to be taken in restoring the parts to health is the thorough removal of all foreign substances about the roots and necks of the teeth. In my experience I have found no better method than that taught by Dr. Riggs, of Hartford, Con-

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\* This paper will be found on first page of the current number of the DENTAL COSMOS.

necticut. I get good results from the use of his instruments in the removal of the deposit and the diseased edge of the alveolar process. Experience has taught me and many others that it is a very difficult task to scrape all over the convex surface of the root of a tooth and be sure that you have not left a nucleus for a new deposit. In view of this fact, and because of the escharotic and stimulating effects of aromatic sulphuric acid, this agent has been and is used to dissolve the portions that may remain after the operation of scraping.

The fact that sulphuric acid will not dissolve salivary calculus was first brought to my notice by Dr. Bradbury, of Boston. After proving his statement, I found that the sulphate of calcium was but slightly soluble in water, and that pure undiluted sulphuric acid had little or no action at all upon calcium-salts, owing to the fact that a coating of sulphate was formed over the substance acted upon, which protected it from a further action of the acid. If, however, water be added and the solution shaken, this coating, which is slightly soluble in water, will be somewhat removed, and will permit a further action or formation of sulphate. But if the aromatic sulphuric acid be diluted with water, the ginger and cinnamon will be precipitated, and act as so much more foreign substance beneath the gum.

The stimulating and escharotic effects of sulphuric acid and alcohol, which constitute the bulk and active principle of aromatic sulphuric acid, are properties that recommend it for gum-treatment. The acid, by its powerful affinity for water, absorbs it from the gum tissue, or burns it, so to speak; this, combined with the alcohol, stimulates the local nutrient-nerves and blood-vessels to reproduce the tissue destroyed by the acid and instrument, and the gum tissue for a time returns to a normal state of health. If, however, there has been left a nucleus for the accumulation of the lime-salts, the gums will very soon return to an inflamed condition.

To supply a solvent I have used two and one-half per cent. solution of hydrochloric acid, and for the escharotic property, one and one-half per cent. of nitric acid. Nitro-muriatic acid, *when first formed* by this proportion of these acids, is a very powerful solvent. It is about the color of sherry wine, but on standing exposed to the light it deteriorates in strength and color, changing first to an orange then to a lemon color; when of the last-named color it is about the strength of muriatic acid alone. With nitro-muriatic acid we have all the properties of sulphuric acid, and it will do what that acid is supposed to do,—*i.e.*, act as a solvent, as the chlorate of calcium is quite soluble in water. Further than this, nitric acid has a slight astringent action by coagulation of the albumen in the tissue. To

this is added tannin as a further astringent, and resorcin as a disinfectant. Compound tincture of lavender is used to produce the aroma, making it agreeable to the taste; alcohol and water are then added to make the solution four per cent. acid. After cleansing, this has been used with the best results; in no case, to my knowledge, has it been used with anything but success.

From the solvent action of these acids on lime-salts it is evident that care must be exerted in their use, for that which will dissolve salivary calculus will also dissolve inorganic tooth-structure; and let me say here that all that can be expected of acid treatment as a solvent is the decalcification of the deposit. Acids will not affect the albuminous or organic structure of "tartar." The contour of the lump will remain the same until wiped away. Although four per cent. is a weak solution, a few drops applied three or four times at intervals, of the same number of days, will be found effectual as a solvent.

At each time the patient calls, a slender, blunt instrument, on which is wound a bit of cotton, may be used to wipe away mucus and apply the solvent, after which bicarbonate of soda or an alkali should be used to neutralize any acid which may have lodged above the gums on the crowns of the teeth, or at points where the solution is not required. In this way the solvent action can be confined to the desired points.

Where there is a deep pocket, Dr. Whitten, of South Boston, recommends the lancing of the gum, laying the pocket open. The flaps of gum thus produced are soon absorbed, and the parts settle to the remaining pericementum after treatment.

I am well aware of the effects of acids upon the teeth, but this should not be a "bugbear" to frighten us from the possibility of using them and obtaining good results in the treatment of diseased gums and alveolar processes. Arsenic and strychnine are both very poisonous agents, and when taken internally in large doses will destroy life, but small doses are administered internally by experienced practitioners, and are valuable remedial agents in the treatment of certain constitutional troubles. In a large number of cases the combination which I have given has been found valuable for local treatment, and it is with pleasure that I am permitted to introduce it to the profession. The resorcin used in the solvent was brought to my attention by an article in the journal *New Remedies*, September and October numbers. It is a preparation from resin, very closely resembling carbolic acid in its chemical composition and therapeutical properties (carbolic acid,  $C_6H_6O$ , resorcin,  $C_6H_6O_2$ ), but is not so irritating to mucous membranes or disagreeable to the taste.



It is of great importance that one should have the earnest co-operation of the patient, that the parts may be kept clean after the removal of all the foreign substances until the remaining gum-tissue hardens about the teeth. No restoration of the periodontal membrane and alveolus, in my opinion, need be expected.

Tooth-powders containing a large amount of chalk and alkalies are injurious, because they only contribute to and favor the deposit of salts from the saliva.

From the nature of the condition it is evident that the substance used to cleanse the teeth should be soluble in the fluids of the mouth, should arrest fermentation and decomposition, and possess disinfectant and astringent properties, and should be neither alkaline or acid, but neutral in reaction.

For the constitutional treatment of calcic and phosphatic diathesis I must refer you to the best authors on the practice of medicine. The treatment most generally laid down recommends the use of nitro-muriatic acid (five drops after eating, once a day), with a view, I think, to render the excretions sufficiently acid to hold the salts in solution. But, as the exciting cause of either diathesis is not known with any degree of certainty, the systemic treatment must of necessity be more or less uncertain.

Dr. Geo. A. Mills. This is a subject of great interest to me, and I must thank Dr. Niles for bringing it before us in this way. I am surprised that greater interest is not manifested in this direction by the representative men of our profession. I wish there were time for a full discussion of the subject in all its bearings. I cannot agree with Dr. Niles in all the positions he has taken, but I am glad the subject is brought up for discussion at all.

Dr. J. M. Howe. I agree with Dr. Mills as to the importance of this subject, and I move that it be made the subject of discussion at our next meeting.

A vote being taken, Dr. Howe's motion was adopted.

Dr. Bogue. I should like to ask Dr. Niles if he has made inquiry of the cases that have come under his care in the Massachusetts General Hospital as to the condition of the parents, whether the calcic diathesis is inherited or not.

Dr. Niles. I think there were some indications of that, though the observations were not especially made to discover under what conditions these diatheses are present. I have, however, noticed that this deposit is very frequently present to a considerable extent in members of the same family.

The people who applied to the hospital were for the most part from the lower classes, and it was not usual for me to see more than one or two members of the same family.

Dr. Bogue. I asked the question, having had a discussion with one of our members who claimed that there was no cure for the disease,—that all that was done was simply an alleviation. I am not able to combat that statement; but for thirteen, fourteen, or fifteen years I happen to have had a family in my hands, the father of which died from stone, or the results of an operation for stone, the mother of which is suffering from gout. Every member of the family, with one exception, has suffered more or less from the condition described this evening. That one is in exactly the contrary state. I think I am quite within bounds, although I cannot give the exact number at this time, in saying that one-third of the teeth of the family have been lost because the true condition of things was not recognized in season. Perhaps there has been only alleviation gained, but there have been no teeth lost since the family have been under my care, and alleviation which is of ten or twelve years' standing, or more, is of some value. Now we go a step beyond that, and say to ourselves that so long as the patient remains in a fair degree of health recurrence of those symptoms will not take place. More might be said in regard to other cases, but I mention this one family because the hereditary tendency is so strongly marked, and because others here present have had occasion to examine members of it repeatedly. It seems as though this tendency, however strong, could be successfully combated.

Dr. Niles. The local treatment which may be employed in an advanced stage of odontolithus must necessarily be to arrest the further advance of the trouble, reduce inflammation, etc. So far as I know, there is no treatment which will assist nature to reproduce a periodontal membrane where it has been entirely destroyed. All that can be done is to clean the root so that the gum may settle about it without inflammation. I do not think the membrane will ever reform.

Dr. Atkinson. Upon what do you base that negative statement, so strongly made?

Dr. Niles. I think in all denuded bone it is a fact recognized by surgeons that the bone has to be removed so far as the periosteum is destroyed.

Dr. Atkinson. It is hardly proper for me to say anything after the resolution to lay the subject over to the next evening. I will endeavor to establish the positive side of the question when the time comes.

Dr. Niles. I am open to conviction, but it will only be after I have seen a tooth with periodontal membrane destroyed recovered with tissue, and blood-vessels entering the cementum, and the re-establishment of circulation.

Dr. Atkinson. Plenty of them, and alveolar processes and entire gum can be exhibited. I have such cases of reproduction that have been in existence over fifteen years.

Dr. Niles. How do you stop the periodontal membrane from forming over the crown?

Dr. Atkinson. If Nasmyth's membrane never had been removed it would form over the crown.

The President. I wish to express to Dr. Niles the thanks of the society for giving us the result of his investigations, which are both profitable and stimulating to us.

Adjourned.

#### CENTRAL DENTAL ASSOCIATION OF NORTHERN NEW JERSEY.

THE annual meeting of the Central Dental Association of Northern New Jersey was held at the office of Drs. Richards and Levy, Orange, N. J., February 24, 1881.

The attendance of members was large from every northern county. This association, which has been incorporated barely a year, now numbers among its members the most prominent and energetic practitioners in the northern part of the State and cities adjacent to New York.

The following officers were elected for the ensuing year:

*President*.—Chas. A. Meeker, of Newark.

*Vice-President*.—F. A. Levy, Orange.

*Secretary*.—G. Carleton Brown, Elizabeth.

*Treasurer*.—D. C. McNaughton, Jersey City.

*Executive Committee*.—J. Allen Osmun, Newark; W. P. Richards, Orange; Jas. G. Palmer, New Brunswick; E. H. Bunting, Newark; and F. C. Barlow, Jersey City.

G. CARLETON BROWN, *Secretary*.

#### INTERNATIONAL MEDICAL CONGRESS—SEVENTH SESSION, LONDON, 1881.

THE following circular has already been widely distributed, but we would be pleased to see its republication in the DENTAL COSMOS, lest it may not have reached some of our *confrères* who might favor us with their presence or with contributions:

"SIR:

"We have the honor to inform you that at the close of the Sixth Session of the International Medical Congress, held last September in Amsterdam, under the presidency of Professor Donders, of Utrecht, a unanimous desire was expressed that the next meeting should take place in Great Britain, in 1881.

"This desire having been communicated to the Presidents of the Royal Colleges of Physicians and Surgeons in London, they convened a meeting of delegates



from the various universities, colleges, and other public bodies of the United Kingdom, including the principal medical societies, the British Medical Association, and the medical departments of the army, navy, and India office, in order to obtain a thoroughly national representation of feeling and opinion.

"The response to this appeal having been most cordial, it was decided at the meeting of delegates thus convened to comply with the wish expressed at the meeting at Amsterdam, and to hold the congress in London. A general committee of organization was appointed—an executive committee and a reception committee—to carry out the necessary details.

"In past years the International Medical Congress has met in the following cities: The first meeting took place in Paris, in 1867; the congress next met in Florence, in 1869; then in Vienna, in 1873; in Brussels, in 1875; in Geneva, in 1877; and last year (1879), the congress, as already stated, met in Amsterdam.

"Her Majesty, the Queen, has most graciously given proof of her good-will towards the cause of medical science and our efforts in its furtherance by authorizing us to place the congress under her royal patronage.

"His Royal Highness, the Prince of Wales, has likewise shown the unvarying interest he takes in the progress of medicine by according a similar favor.

"The work of the congress will be carried on in fifteen sections. The days of the meeting will extend from Wednesday, the 3d, to Tuesday, the 9th of August, both days included. A reception of welcome will take place on the evening of August 2d.

"The meetings will be chiefly held in the Halls of the University of London and in Burlington House, where, in a most liberal manner, the use of rooms for the general and sectional meetings has been granted to the congress by the authorities of the University of London, the Royal Society, the Society of Antiquaries, the Astronomical Society, the Linnean Society, the Chemical Society, and the Geological Society.

"There will be a museum open during the meeting, to which contributions of professional interest will be made. Evening receptions will be held and excursions arranged to various places of interest.

"The attendance of our countrymen from all parts of the United Kingdom, India, and the Colonies, will probably be large, and various circumstances make it probable that a large number of distinguished men from many countries will be attracted to England as our guests on the occasion of the seventh session of the congress, and it is our desire to receive them with all cordiality and honor.

"It is convenient to inform our colleagues abroad that ladies will be invited to the social and ceremonial meetings of the congress, but will not be admitted to its business meetings.

"It will be necessary for all who wish to make communications to the congress to intimate their intentions to the secretaries of the several sections, and to furnish an abstract of their papers before the 30th of April, when the committee hope to complete the arrangements for the meeting and to issue a programme of the business.

"We have the honor to be, sir, yours faithfully,

"J. RISDON BENNETT,

*"Chairman of the Executive Committee.*

"WILLIAM MACCORMAC,

*"Secretary-General."*

All communications respecting the general business of the con-

gress should be addressed to William MacCormac, Esq., Hon. Secretary-General, 13, Harley Street, London, W.

#### SECTION XII.—DISEASES OF THE TEETH.

*President.*—Edwin Saunders, Esq.

*Vice-Presidents.*—John Tomes, Esq., F.R.S.; Charles Spence Bate, Esq., F.R.S.

*Secretary.*—C. S. Tomes, Esq., F.R.S.

The following is the proposed list of subjects for discussion, subject to revision:

1. Replantation and transplantation of teeth.
2. Premature wasting of the alveoli and its amenability to treatment.
3. The share taken by septic agencies in causing diseases of the dentine, dental pulp, and periosteum.
4. Mercurial and syphilitic teeth, and the causes of irregularities of position of the teeth.
5. Erosion of the teeth.
6. New dental instruments and methods of operating.

The President and Secretaries will feel obliged by your sending a reply, stating if it is your intention to be present at the congress, and if you have any suggestion as to subjects for discussion. By specifying a certain number of subjects, it is hoped that faithful discussion of these may be insured; but it is by no means intended to exclude others, and papers on any subject appropriate to the section will be received and read. Early notice of papers is particularly requested.

All communications regarding Section XII. should be addressed to C. S. Tomes, Esq., 37, Cavendish Square, W., London, Eng.

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#### GEORGIA STATE DENTAL SOCIETY.

THE next regular annual meeting of the Georgia State Dental Society will be held in Savannah, May 10, 1881. The State Board of Dental Examiners will meet at the same time and place.

L. D. CARPENTER, *Corresponding Secretary.*

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#### TEXAS STATE DENTAL ASSOCIATION.

THE Texas State Dental Association meets in the City of Austin, Texas, on the 4th day of May next.

W. R. CLIFTON, *Corresponding Secretary.*

### DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE thirteenth annual meeting of the Dental Society of the State of New York will be held in Albany, on Wednesday, May 11, 1881.

Besides the transaction of necessary business, much of which is interesting and important to the profession of the State especially, essays will be read by the following members: Drs. N. W. Kingsley, C. E. Francis, J. W. Clowes, G. W. Weld, New York; S. B. Palmer, Syracuse; A. P. Southwick, Buffalo; C. A. Marvin, Brooklyn; and A. M. Holmes, Morrisville.

Two prizes are offered for papers of merit,—one, the "Whitney Memorial Prize," consisting of thirty-five dollars, for members only; while the other, a special prize of forty dollars, upon a given subject, is open to all dentists.

Reports of cases in practice and the discussion of designated topics occupy a portion of each session.

Visitors from kindred organizations in adjoining States are always cordially received.

The annual gatherings of this body are gradually increasing in interest and importance, and the approaching one already promises to be fully equal to any former meeting. Every effort will be made to increase the social element, which has heretofore been especially characteristic.

S. A. FREEMAN, *Secretary*.

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### SOUTH CAROLINA STATE DENTAL ASSOCIATION.

THE eleventh annual meeting of the South Carolina State Dental Association will be held May 3, 1881, at Cheraw, S. C.

Applications for license by examination or diploma will receive the attention of the State Board of Dental Examiners at the above time and place.

R. ATMAR SMITH, *Corresponding Secretary*.

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### KANSAS STATE DENTAL ASSOCIATION.

THE tenth annual meeting of the Kansas State Dental Association will convene at Topeka, on Tuesday, May 3, 1881.

J. A. YOUNG, *Secretary*.

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### MISSOURI DENTAL COLLEGE.

THE fifteenth annual commencement exercises of the Missouri Dental College took place in connection with those of the St. Louis



Medical College, at the Mercantile Library Hall, St. Louis, Mo., on the evening of Thursday, March 3, 1881.

The valedictory address was delivered by Prof. J. T. Hodgen.

The number of matriculates for the session was thirteen.

The degree of D.D.S. was conferred on one graduate, Joseph F. Hassell, Jr., of Missouri.

### BALTIMORE COLLEGE OF DENTAL SURGERY.

THE forty-first annual commencement of the Baltimore College of Dental Surgery was held in the Academy of Music, Baltimore, on Wednesday, March 2, 1881, at 2½ P.M.

The valedictory address was delivered by Rev. William Kirkus, D.D.; the class address by B. Holly Smith, Jr.

The number of matriculates for the session was ninety-seven.

The degree of D.D.S. was conferred on the following members of the graduating class by Professor F. J. S. Gorgas, Dean:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
Samuel B. Adair.....	Georgia.	Henry D. Kurtz.....	New York.
Roderick A. Barrick.....	Maryland.	Frank Adolph Lee.....	Virginia.
Ellis B. Bliss.....	District of Col.	Myron M. Maine.....	Connecticut.
Ludwig Brandt.....	Germany.	Lemuel Estes Meador.....	South Carolina.
Benijah S. Byrnes.....	Mississippi.	Frank S. Milbury.....	New Brunswick
James V. Calver.....	District of Col.	Robert W. Morgan.....	Virginia.
George White Carman.....	New Jersey.	Edgar P. Parsons.....	West Virginia.
Myron A. Carman.....	New York.	H. Spencer Pitts.....	Virginia.
Leonard T. Caughy.....	Maryland.	Edgar R. Rust.....	Virginia.
Thomas E. Craddock.....	Virginia.	P. Henry Salles.....	Louisiana.
Robert B. Cummins.....	Pennsylvania.	Frank Morris Seebold.....	Pennsylvania.
E. R. De Normandie.....	Pennsylvania.	James J. Seigler.....	South Carolina.
Benjamin H. Douglass.....	Massachusetts.	Damian Silva.....	Cuba.
Byrd Page Dunnivant.....	Virginia.	B. Holly Smith, Jr.....	Maryland.
Frank O. Eilenberger.....	Illinois.	Edwin Byron Smith.....	Pennsylvania.
Charles M. Emmart.....	Maryland.	Frank A. Speck.....	Tennessee.
Benjamin Flannigain.....	Maryland.	Charles L. Steel.....	Virginia.
William G. Foster.....	Maryland.	Robert W. Sterling.....	South Africa.
Theodorick T. Frazier.....	North Carolina.	Caleb A. Thompson.....	Virginia.
Laurence De L. Gorgas.....	Maryland.	Wesley F. Tigner.....	Georgia.
James H. Grant.....	Texas.	William Townes, Jr.....	Virginia.
Charles Church Harris.....	Maryland.	John Charles Wachter.....	Maryland.
Howard W. Hoopes.....	Maryland.	Effingham Wagner.....	Alabama.
James A. Hurdle.....	North Carolina.	John Henry Walker.....	Louisiana.
John G. Keller.....	Georgia.	William A. White.....	New York.
Daniel O. Knight.....	District of Col.	W. Cuttino Wilbur.....	South Carolina.
E. Powell Wright.....			Virginia.

### OHIO COLLEGE OF DENTAL SURGERY.

THE thirty-fifth annual commencement exercises of the Ohio College of Dental Surgery took place at College Hall, Cincinnati, Ohio, on Thursday evening, March 3, 1881.

The class oration was delivered by H. D. Eggers, D.D.S.; the valedictory address by Rev. Nathaniel West, D.D.

The number of matriculates for the session was eighty-one.

The degree of D.D.S. was conferred on the following members of the graduating class by George W. Keely, D.D.S., President of the Board of Trustees:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
C. S. Archer.....	Indiana.	E. H. Hawkins.....	Ohio.
P. D. Anderson.....	Kentucky.	W. V. Grove.....	New York.
D. A. Askew.....	Mississippi.	B. P. Ingram.....	Ohio.
E. S. Bowen.....	Massachusetts.	E. L. Jauncey.....	Illinois.
H. W. Brodbeck.....	Indiana.	G. S. Junkerman.....	Ohio.
E. P. Binford.....	Indiana.	W. C. Jeffry.....	Indiana.
O. Buckwalter.....	Ohio.	Julius Klethke.....	Prussia.
J. S. Converse.....	Ohio.	J. D. Morris.....	Ohio.
S. B. Cook.....	Tennessee.	S. H. Millikin.....	Ohio.
C. C. Corbett.....	Vermont.	J. B. McGee.....	Kentucky.
T. Y. Cooper.....	Kentucky.	Zeno F. Meyer.....	Wisconsin.
F. H. Deterding.....	Pennsylvania.	S. D. Myers.....	Ohio.
John Donovan.....	Ohio.	C. B. Orbison.....	Ohio.
H. D. Eggers.....	Kentucky.	W. G. Price.....	Indiana.
T. H. Foulds.....	Ohio.	Edward Pittwood.....	Illinois.
W. L. Hughes.....	Kentucky.	E. H. Rothe.....	Ohio.
Al. O. Howe.....	Ohio.	J. E. Robinson.....	Ohio.
J. C. Heron.....	Maryland.	B. G. Rees.....	Kentucky.
C. E. Hale.....	Minnesota.	E. C. Sears.....	Ohio.
R. C. Taylor.....	Ohio.		

### DENTAL DEPARTMENT OF VANDERBILT UNIVERSITY.

THE Dental Department of Vanderbilt University held its second annual commencement exercises in the chapel of the University, Nashville, Tenn., on Wednesday evening, February 23, 1881.

The address to the graduates was delivered by Professor Robert W. Steger; the valedictory address by J. D. Moorman, D.D.S., and the address on the presentation of medals by Dr. W. H. Morgan.

The number of matriculates for the session was twenty-one.

The degree of D.D.S. was conferred on the following members of the graduating class by Chancellor E. C. Garland:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
James Duncan Moorman.....	Texas.	John Philip Bailey.....	Tennessee.
Horace Kent Campbell.....	Tennessee.	Levi Gordon Anderson.....	Tennessee.
James Levie Foster, M.D.....	Tennessee.	W. B. Spencer.....	Tennessee.
James Andrew Fountain.....	Texas.	Samuel M. Prothro, M.D., <i>ad</i>	
Robert McKrosky Bogle.....	Tennessee.	<i>eundem</i> .....	Tennessee.
Andrew Jackson Lawrence.....	Tennessee.		

### BOSTON DENTAL COLLEGE.

THE thirteenth annual commencement exercises of the Boston Dental College took place at Memorial Hall, Boston, Mass., on Wednesday, March 2, 1881, at 7.30 P.M.

The address to the graduates was delivered by Rev. W. S. Studley, D.D.; the valedictory by Frank H. Coburn, D.D.S., of the graduating class.

The number of matriculates for the session was fifty-eight.

The degree of D.D.S. was conferred on the following members of the graduating class by the President of the college, Professor Isaac J. Wetherbee, D.D.S.:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
George Caleb Bates.....	Massachusetts.	Edward A. Jones.....	New Hampshire.
Edmund R. Brown.....	Massachusetts.	Walter G. Kendall.....	Massachusetts.
Francis H. Coburn.....	New Hampshire.	Walter M. Lamkin.....	Massachusetts.
Walter J. Currier.....	New Hampshire.	Herbert A. Merrill.....	Maine.
W. N. Fairbanks.....	Massachusetts.	James E. Quinn.....	New Hampshire.
Frederic S. Faxon.....	Massachusetts.	Charles L. Sprague.....	Massachusetts.
Frank Joy Fesler.....	Massachusetts.	Charles P. Stimpson.....	Massachusetts.
John Edwin Graves.....	Massachusetts.	A. F. Townsend.....	Massachusetts.
Aaron Hill, Jr.....	Massachusetts.	Samuel W. Whitney.....	Massachusetts.

### PHILADELPHIA DENTAL COLLEGE.

THE eighteenth annual commencement of the Philadelphia Dental College was held at the American Academy of Music, Philadelphia, Saturday, February 26, 1881, at 8 o'clock P.M.

The address to the graduates was delivered by R. Shelton MacKenzie, D.C.L.; the valedictory by J. S. Franklin, D.D.S.

The number of matriculates for the session was one hundred and eleven.

The degree of D.D.S. was conferred on the following graduates by the President of the Board of Trustees:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
Charles F. Booth.....	New York.	B. Theo. Mooney.....	New York.
Arthur S. Barnes.....	New York.	J. Allen Miles.....	South Carolina.
H. R. Beals.....	Massachusetts.	C. H. McNaughton.....	Ohio.
A. G. Bruce.....	Pennsylvania.	John J. McGrew.....	Pennsylvania.
George F. Barber.....	Vermont.	O. J. Marshall, L.D.S.	France.
J. Edgar Blake.....	Massachusetts.	Phineas P. Nichols.....	Maine.
Alfred Burne.....	Australia.	James E. O'Brien.....	Massachusetts.
J. F. Clement.....	New York.	Fred. W. Prehn.....	Minnesota.
Martin B. Culver.....	Pennsylvania.	Frederick Primrose.....	Nova Scotia.
William H. Carson.....	Ohio.	James Primrose.....	Nova Scotia.
S. Parker Cottrell.....	Rhode Island.	Richard Parody.....	Spain.
L. S. Chilcott.....	Maine.	James P. Parker.....	Vermont.
Jessie F. Detchon.....	Ohio.	Herbert B. Perry.....	Massachusetts.
William C. Foulks.....	Pennsylvania.	William V. Randall.....	Rhode Island.
Fred. H. Fales.....	Maine.	Charles A. Smith.....	New York.
J. S. Franklin.....	Mexico.	Benjamin S. Scott.....	Massachusetts.
Leopold Greenbaum.....	Pennsylvania.	James W. Slonaker.....	Pennsylvania.
A. H. Greenawalt.....	Pennsylvania.	George R. Shidle.....	Pennsylvania.
E. F. Hollingsworth.....	North Carolina.	Emil Sperling.....	Germany.
Henry Hofer.....	Austria.	Clare L. Smith.....	Ohio.
Arthur Hare.....	Ireland.	Charles H. Sherwood.....	Illinois.
Hardie C. Herring.....	North Carolina.	Will. X. Sudduth.....	Illinois.
Johnson Husband.....	Ontario, Can.	Charles B. Stoner.....	England.
William A. Lee.....	Pennsylvania.	Will. F. Teeter.....	Pennsylvania.
S. Leslie Lecron.....	Pennsylvania.	C. R. Templeton.....	Oregon.
I. W. Larkworthy.....	Ohio.	Charles E. Ulmer.....	Pennsylvania.
Milton F. Lenox.....	New York.	Elias Uribe.....	U. S. of Col.
Bernhard Lehman.....	Germany.	H. P. Wyman.....	Pennsylvania.
W. S. Morrison.....	Iowa.	J. L. Whytock.....	Utah.



## PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

THE twenty-fifth annual commencement of the Pennsylvania College of Dental Surgery was held at the American Academy of Music, Philadelphia, Saturday, February 26, 1881, at twelve o'clock M.

The address to the graduates was delivered by Henry C. Chapman, M.D.

The number of matriculates for the session was one hundred and thirty-two.

The degree of D.D.S. was conferred on the following graduates by Dr. S. D. Gross, President of the Board of Trustees:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
W. R. Allison.....	Ohio.	C. F. Kaufman.....	Pennsylvania.
G. H. Ashman.....	Pennsylvania.	Bryant Kerr.....	Illinois.
L. Bischoff.....	England.	Oscar Klein.....	Germany.
Joseph R. Bou.....	Cuba.	A. O. Lester.....	Georgia.
Theodore F. Boyd.....	Pennsylvania.	W. B. Libbey, .....	Pennsylvania.
George V. I. Brown.....	Minnesota.	Jas. A. Lupton.....	Ohio.
Wm. Lewis Cave.....	Pennsylvania.	C. H. S. Littleton.....	Maryland.
F. De P. Chaguaceda.....	Cuba.	A. M. Lorenz.....	Germany.
Fred. B. Clapp.....	Illinois.	R. H. Meecredy.....	England.
Lewis P. Cook.....	Pennsylvania.	H. T. Nathorst.....	Sweden.
Emiliano Currea.....	South America.	Olga von Oertzen.....	Germany.
W. Dammann.....	Germany.	Arthur H. Palmer.....	Pennsylvania.
Edelmiro Dalmau.....	Cuba.	James G. Palmer.....	New Jersey.
Art. W. Deane.....	Vermont.	W. H. Painter.....	Pennsylvania.
Otto R. Doeltz.....	Germany.	Lizzie E. Pepper.....	Pennsylvania.
Anna von Doemming....	Germany.	Jose Y. Rabell.....	Cuba.
Nelson P. Duffy.....	Pennsylvania.	E. H. Raffensperger.....	Pennsylvania.
J. M. Fulton.....	Pennsylvania.	Benjamin H. Reed.....	New Jersey.
Fred. M. Gantz.....	Pennsylvania.	William Reeder.....	Pennsylvania.
Eduardo Gaviria.....	South America.	H. E. Roberts.....	New Jersey.
M. D. Galbraith.....	Pennsylvania.	Edmund Shilton.....	England.
R. F. Guenther.....	Germany.	G. L. Simpson.....	Pennsylvania.
Geo. H. L. Haar.....	Pennsylvania.	J. A. Smalley.....	Iowa.
John M. Hales.....	Wisconsin.	Christian Schunk.....	Germany.
J. G. Halsey.....	New Jersey.	A. M. Stewart.....	Pennsylvania.
E. E. Harrington.....	New York.	J. F. Shannon.....	Pennsylvania.
J. P. Haworth.....	Pennsylvania.	Jos. T. Stradling.....	Pennsylvania.
Walter S. Hoke.....	Pennsylvania.	F. C. Swartz.....	Pennsylvania.
R. H. Horner.....	Pennsylvania.	Z. L. Waugaman.....	Pennsylvania.
F. E. Holden.....	Pennsylvania.	M. B. Wengert.....	Pennsylvania.
M. G. Jenison.....	Minnesota.	Wm. T. Wallace.....	Ohio.
S. A. Johnston.....	Pennsylvania.	C. Garrison White.....	Pennsylvania.

## UNIVERSITY OF PENNSYLVANIA—DENTAL DEPARTMENT.

A PUBLIC commencement of the University of Pennsylvania, including the Department of Dentistry, was held at the American Academy of Music, Philadelphia, on Tuesday, March 15, 1881.

The annual address was delivered by Professor Horatio C. Wood, M.D.

The number of matriculates for the course of 1880-81 was one hundred and ten.

The degree of D.D.S. was conferred on the following members of the dental class by William Pepper, M.D., Provost of the University:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
Sumner B. Abbott.....	Pennsylvania.	C. C. Martin.....	Louisiana.
W. H. Barclay, M.D.....	Pennsylvania.	Edwin M. Martin.....	Pennsylvania.
Walter W. Baxter.....	Canada.	Robert B. Martin.....	Louisiana.
Miles R. Biggar.....	Canada.	A. E. Mascourt.....	Cuba.
James Brister.....	Pennsylvania.	Burr T. Mason.....	New York.
J. H. Campbell.....	Pennsylvania.	George A. Maxfield.....	New Hampshire.
Albert Cornog.....	Pennsylvania.	Cyrus T. Meaker.....	Pennsylvania.
Milton J. Downer.....	New York.	J. Justiniani y Molina.....	Cuba.
Charles J. Ellis.....	New York.	H. Leslie Morse.....	Pennsylvania.
Juan Falero.....	Cuba.	Harry C. McClure.....	Pennsylvania.
Horace Gauger.....	Pennsylvania.	Benjamin F. Place.....	Pennsylvania.
Justo O. Guiteras.....	Cuba.	Herman L. Reinecke.....	Pennsylvania.
Justin E. Harlan.....	Pennsylvania.	M. L. Rhein, M.D.....	New York.
Earl P. Hawes.....	Rhode Island.	Henry Riedel.....	Brazil.
Charles T. Howard.....	New York.	Boyd G. Saunders.....	New York.
Will. A. Johnston.....	Illinois.	Thomas D. Sinclair.....	Pennsylvania.
J. D. Justiniani.....	Cuba.	Victor M. Smith.....	New York.
Carl P. A. Kaas.....	Norway.	Charles C. Southwell.....	Wisconsin.
Theo. V. Ketcham.....	Connecticut.	William W. Stewart.....	Pennsylvania.
Richard H. Kimball.....	Illinois.	Ludwig H. Voelkler.....	Pennsylvania.
A. Stewart Koser.....	Pennsylvania.	Charles H. Wells.....	Pennsylvania.
Albert J. Kutz.....	Pennsylvania.	William C. Wendel.....	Wisconsin.
Frank W. Lang.....	Pennsylvania.	Stephen R. Wing.....	Pennsylvania.
George H. Worrall.....	Pennsylvania.		

### NEW YORK COLLEGE OF DENTISTRY.

THE fifteenth annual commencement of the New York College of Dentistry was held at Chickering Hall, New York, Wednesday evening, February 23, 1881.

The address to the graduates was delivered by Rev. John Hall, D.D.; the valedictory by J. Torrence Tate, D.D.S.

The number of matriculates for the session was one hundred and seven.

The degree of D.D.S. was conferred on the following graduates by Dr. William H. Allen, President of the Board of Trustees:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
Manuel Abello.....	U. S. of Col.	Oscar Middlekamp.....	Germany.
Chas. Henry Allen.....	Connecticut.	Thomas Moore.....	England.
Geo. Albert Bradford.....	New Jersey.	Wm. Penn Moss.....	New Jersey.
Robert R. Dalglish.....	Ontario, Can.	Galen Delos Mayer.....	New York.
C. H. De Lamater, Jr.....	New York.	John Howard Reed.....	New York.
Wm. Henry Dadin.....	New York.	Rafael Rico.....	Mexico.
Geo. Herbert Dickey.....	New York.	Clarence P. Robinson.....	Alabama.
Chas. Wm. Ferris.....	Connecticut.	Lewis Wm. Sageman.....	New York.
Manuel Gonzalez.....	U. S. of Col.	Enrique Salierup.....	Porto Rico.
August Grosch.....	Germany.	Roderick McL. Sanger.....	New Jersey.
Louis Grasse.....	New York.	Frederick E. Scofield.....	Connecticut.
Chas. Wm. Hoblitzell.....	Maryland.	Henry H. Sisson.....	West Virginia.
Hermagoras Isea.....	Venezuela, S.A.	Santiago R. Somerville.....	Chili, S. A.
Heliodora Jaramillo.....	U. S. of Col.	John Torrence Tate.....	Oregon.
Daniel Augustus Williams.....	Maine.		

## DENTAL DEPARTMENT OF THE UNIVERSITY OF TENNESSEE.

THE Dental Department of the University of Tennessee held its third annual commencement exercises at the Masonic Theatre, Nashville, Tenn., on Tuesday evening, February 22, 1881.

The address to the graduates was delivered by Professor J. Y. Crawford, M.D., D.D.S.; the valedictory address by R. N. Kesterson, D.D.S., of the graduating class.

The degree of D.D.S. was conferred on the following members of the graduating class by Rev. Thomas W. Humes, S.T.D., President of the University, assisted by Dr. Robert Russell, Dean of the Dental Department:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
J. W. Harman.....	Tennessee.	J. C. Wiggins.....	Mississippi.
H. M. Clark.....	South Carolina.	F. F. McKissack.....	Tennessee.
S. Lanier.....	Tennessee.	W. C. Crow.....	Mississippi.
R. E. Burns.....	Tennessee.	J. A. Harmon .....	South Carolina.
G. B. Clement.....	Mississippi.	R. T. Davidson.....	Tennessee.
C. D. Smith.....	Alabama.	C. J. Toole.....	Georgia.
B. B. Davis.....	Alabama.	M. A. Bland.....	North Carolina.
T. J. Key.....	Georgia.	A. Hartman.....	Tennessee.
S. S. Chisholm.....	Tennessee.	J. W. McElhaney.....	Georgia.
R. N. Kesterson.....	Tennessee.	W. F. Fowler.....	Tennessee.
J. C. Belote.....	Tennessee.		

## ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO.

THE thirteenth annual examination of the Royal College of Dental Surgeons of Ontario was held in Toronto, March 1, 1881.

No formal commencement is held. The examination being entirely written, no thesis is required.

Students in attendance on lectures, forty-one.

The following gentlemen received license to practice dentistry and the title L.D.S. (Licentiate of Dental Surgery), viz.:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
C. N. Johnson.....	Oshawa.	J. W. Ivory.....	Bowmanville.
S. W. Brown.....	Hamilton.	D. T. Baxter.....	St. Catharines.
I. P. Marshall.....	Brampton.	M. Buggin.....	Fergus.
F. J. Andrews .....	Alliston.	A. D. Cameron.....	Lancaster.
C. L. Hawley.....	Trenton.	A. P. Bowes.....	Ottawa.
H. Weller.....	Zephyr.	J. H. McCullough.....	Seaforth.
E. Keefer.....	Toronto.	J. C. Bower.....	Ottawa.
B. Avery.....	Gananoque.	T. H. Gordon.....	Elora.
A. G. McLean.....	Mallorytown.		

## INDIANA DENTAL COLLEGE.

THE second annual commencement of the Indiana Dental College was held March 9, 1881, in the Lecture Hall of the Indiana Medical College, Indianapolis.



The address to the graduates was delivered by J. K. Pattison, D.D.S., and the class valedictory by John R. Lowe, D.D.S.

The number of students attending the session was twenty-two.

The degree of D.D.S. was conferred on the following graduates:

J. R. Lowe, Bedford, Indiana.	L. E. Uhrich, Blue Mound, Illinois.
J. E. Waugh, Fort Wayne, Indiana.	I. B. Rembert, Natchez, Mississippi.
H. H. De Pew, Salem, Indiana.	J. G. Parsons, Grenada, Mississippi.
L. J. Allen, Thorntown, Indiana.	C. A. Pooler, Utica, New York.
DeW. C. West, Elkhorn, Wisconsin.	J. C. Walton, Fowlerville, Michigan.

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## EDITORIAL.

### ANOTHER DENTAL JOURNAL.

WE have received the first number of the *Ohio State Journal of Dental Science*, a periodical to be published bi-monthly by Messrs. Ransom & Randolph, Toledo. It is edited with his old-time geniality by Dr. Geo. Watt, whose many friends will be gratified to learn of his restoration to health, as evidenced by his undertaking the editorial management of what he expects, with the assistance of his readers, to make "the most thoroughly original journal known to the profession." In his salutatory he says:

"A few years ago the editorial pen was hopelessly laid aside, and without a murmur. The ability to take it up again is as much a surprise to the writer as it can be to any one. With thanks to the Giver of all good for the gift restored, it shall be ours to dedicate it anew to the advancement of the knowledge in demand by our profession for the welfare of man. With zeal as fresh as ever, and with a higher sense and a more accurate knowledge of the duties involved, the work is cheerfully resumed."

The make-up of this first number is somewhat heterogeneous, but we have the editor's promise of better order when matter shall have accumulated on his hands. The general appearance of the journal is neat, but it is only fairly free from typographical errors. We note, however, a misstatement or two, presumably not made by the "intelligent compositor." Dr. Beale and Dr. J. D. White, both of whom are spoken of as dead, are still in practice.

In dental journalism, as in other things, there "is always room at the top." We give the new venture our best wishes that it may reach the top—by its own deserving.

### DEFERRED MATTER.

THE reports of the college commencements have crowded out several communications, as well as the departments of Hints and Queries and Periscope, from this number. We ask the indulgence of contributors and readers.

## DENTAL LEGISLATION IN WEST VIRGINIA.

BELOW will be found the text of a bill to regulate the practice of dentistry in West Virginia, recently passed by the Legislature, and approved by the Governor. This makes thirteen States which have legislation on the subject, as follows: Alabama, Georgia, Indiana, Kentucky, Louisiana, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, and West Virginia. If there are any others we shall be glad to chronicle the fact, and would be thankful to receive information.

"A BILL TO REGULATE THE PRACTICE OF DENTISTRY IN THIS STATE AND TO PROTECT THE PEOPLE AGAINST EMPIRICISM IN RELATION THERETO.

*"Be it enacted by the Legislature of West Virginia :*

"SECTION 1. That after the passage of this act it shall be unlawful for any person to engage in the practice of dentistry for compensation in this State, unless such person shall have received a diploma from some dental college, duly incorporated under the laws of this State or some one of the United States or foreign government, in which is annually delivered in good faith a full course of lectures and instruction in dentistry, or shall have obtained a license from a board of dentists, duly authorized and appointed by the authorities of this or some one of the United States, in the manner hereinafter mentioned.

"SEC. 2. It shall be the duty of the Board of Public Works to appoint nine dentists learned in the profession, three of whom shall be appointed in each Congressional district, who shall constitute a board for the examination of applicants in their own district, and before which any applicant for license to practice dentistry shall appear and be examined touching his proficiency in said art or profession, and if two or more of said board shall deem the said applicant qualified to practice said profession they shall sign said license, for making which examination the said examiners shall have a fee of two dollars each, to be paid by the applicant. But before said application for a license shall be made to said examiners or signed by them, the applicant shall produce to said examiners a certificate from the County Court of some county that he has resided in said county for twelve months next preceding the date of such certificate, and that he is a person of good moral character; *Provided*, That nothing in this act shall prevent any person from extracting teeth or in any manner interfere with any person now engaged in the practice of dentistry in this State. The term of office of such board shall be five years.

"SEC. 3. Any person violating the provisions of this act shall be deemed guilty of a misdemeanor, and on conviction thereof shall be fined not less than ten or more than one hundred dollars."

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BIBLIOGRAPHICAL.

PLASTICS AND PLASTIC FILLING; as Pertaining to the Filling of all Cavities of Decay in Teeth below Medium in Structure, and to Difficult and Inaccessible Cavities in Teeth of all Grades of Structure. With illustrations. By J. FOSTER FLAGG, D.D.S. Philadelphia: Presley Blakiston, 1881.

The volume before us is an octavo of 207 pages, printed on excellent paper, with wide margins, in a good, clear-faced type, and is well and tastefully bound, making altogether a very fine appearance, and an exceptionally agreeable book to read, so far as its mechanical construction is concerned.

The subject of Plastic Fillings—their manufacture, qualities, employment, etc.—is discussed in seventeen chapters, with the author's usual careful attention to details, and with more than his usual condensation. Whatever may be thought of Dr. Flagg's theories or practice, he has evidently made an honest and earnest effort in this volume to give the benefit of his experience to the profession. The teaching is so explicit that none need complain that there is any want of definiteness in it.

Dr. Flagg may be an extremist in his indorsement of "plastics," but the subject is one which, like Banquo's ghost, will not down, and which is more and more claiming, nay, compelling, investigation. Its discussion, therefore, without prejudice, without partiality, without exaggeration, and especially without personalities, is certainly desirable; for, whether the truth lies at either extreme or midway between, that is or should be the object sought. We welcome the book as an authoritative exponent of the author's views, and commend its careful study not alone to those who desire to learn what is taught therein, but especially to all who propose to write or speak hereafter on the subjects discussed, that thus we shall have fewer men of straw set up for the purpose of illustrating how easily they can be knocked down. Meanwhile, we commend our readers to a perusal of Dr. Truman's carefully-considered comments on the book in this number of the DENTAL COSMOS.

**HORSES' TEETH:** A Treatise on their Mode of Development, Physiological Relations, Anatomy, Microscopical Character, Pathology, and Dentistry. Based on the Works of well-known Odontologists and Veterinary Surgeons. To which is added a Vocabulary of the Medical and Technical Words used. By WILLIAM H. CLARKE. New York: Published by the author. 1880.

Such is the title of a work we have just read with considerable interest, because it embraces much that is instructive and useful. Designed as the publication is to give a synopsis of the fundamental principles of dental science, it has a defect largely attributable, it would seem, to the author's lack of a knowledge which can only be gained by a practical and personal experience in the specialty of which he treats.

The book is wholly a compilation, and though the selections are generally from works of reliable authors, the compiler has made it



unnecessarily heterogeneous in his desire to have too large a number of authors represented and to embrace too wide a field. He has also erred, where there are different theories advanced, in not designating which is the correct or accepted one of to-day. Especially is this true in the chapter on the development of the teeth. In quoting from Messrs. Hunter, Owen, Tomes, and others, it would certainly be of great satisfaction to the reader to find a note stating that the three-page quotation from Professor C. S. Tomes represents clearly and concisely the views of modern odontologists.

Again, in the chapter on temporary dentition the reader, from the various quotations, is left somewhat in doubt as to whether the horse has twenty-four or twenty-eight deciduous teeth; and the chapter following, on permanent dentition, containing as it does much valuable information, would have been more complete had the discrepancy which exists between the number of permanent teeth, which is given as forty (40), and the number belonging to the ancestral horse forty-four (44), been explained by the statement that the first premolar is rudimentary in the horse, and hence lost early, though kept long enough to show the relation his dentition has to the typical mammalian number, and also illustrating in this change from forty-four to forty an interesting transitional feature.

In speaking of the efficient service of the molars in grinding, or triturating, the food, the author commits a great error in indorsing the quotation which gives the information that the molar teeth of the horse (like the incisors of the rodents) grow from permanent pulps throughout the life of the animal.

The chapter on canine teeth or tusks contains much of interest, and fully sustains the theory that many horses suffer from febrile irritations, as the result of interrupted dentition, and that the free use of the lance in such cases has proven as serviceable as when used on an obstructed eye-tooth of a child. A distressing cough, or the disease known as lampass, which so seriously interferes with the horse in feeding, is shown, in many cases, to be largely due to two or more teeth obstructed in their eruption, and that in such cases the free use of the lance proves a source of the greatest relief.

To state that caries most frequently proceeds from inflammation beginning in the pulp-cavity, or that caries of the roots is the result of inflammation of the alveolo-dental periosteum is certainly far from the experience of the practical dentist, but, notwithstanding these defects, there is much of value to all who are interested in the proper care and nourishment of the horse in this as well as the succeeding chapters, on the teeth and their influence and care, their indications of age, their nerves, etc.

We cannot forbear a comment on the foot-note, page 31, which

evidences very clearly that the author is entirely ignorant of the principles involved in the attempt at preservation of the pulp, its capacity for toleration under favorable influences, and the possibilities of its recuperative power, and also of the fact that the pulp in a completed tooth is but the uncalcified portion of the organ from which the hard tissues were formed.

C. N. P.

TRANSACTIONS OF THE AMERICAN DENTAL ASSOCIATION. Twentieth Annual Session, 1880.

A copy of the above transactions for 1880 lies before us, and it is not too much to say that it should find a place in every dental library. It contains, besides an orderly epitome of the proceedings proper, excellent reports in the various sections on pathology, therapeutics, and materia medica; operative dentistry; anatomy, physiology, histology, microscopy, and etiology; dental literature and nomenclature; dental education; artificial dentistry, metallurgy, and chemistry, as also a number of volunteer papers of more than ordinary interest—the whole covering a wide range of subjects of prime interest to the profession at large. A full table of contents affords a ready reference to any particular subject. It is printed on excellent paper, and the neat typographical appearance generally merits special remark.

A PRACTICAL TREATISE ON DISEASES OF THE SKIN. By LOUIS A. DUHRING, M. D. Second edition, revised and enlarged. Philadelphia: J. B. Lippincott & Co., 1881.

The work of Professor Duhring, which has for some years been the recognized authority on the subject of skin diseases as seen in this country, needs no special introduction to our readers. The present edition is, however, not merely a reprint, but is a revision and enlargement of its predecessor, the additions being of a character to add greatly to the practical value of the work. Nearly one hundred pages of new matter have been added, containing many valuable suggestions as to treatment, showing a widening experience on the part of the author, and a careful and conscientious study of the researches of his co-laborers.

In the introductory chapter on the anatomy of the skin we notice as new two excellent illustrations of the normal histology of the skin, drawn by Dr. Van Harlingen, and we find also much new matter in reference to the physiology of the skin, incorporating in this department of the book the results of the most recent investigation.

Articles upon uridrosis, phosphorescent sweat, urticaria pigmentosa, circumscribed herpetiform dermatitis, gangrenous dermatitis, perforating ulcer of the foot, tuberculosis of the skin, inflammations of the skin produced by drugs, etc., have been added, and are entirely

new; while others, notably those upon scrofulous and syphilitic skin affections, have been greatly enlarged, in fact, almost re-written.

We notice that the author repeats one remark in regard to dentition which it seems to us is somewhat too broad. He says, "This process must be regarded merely as an exciting cause of cutaneous disorder; its importance, viewed in the light of a cause of disease, is altogether secondary, and should not be overestimated." It is not easy to overestimate the possible derangements to which pathological dentition may give rise, though its average influence as a disturbing element is probably overrated.

**DRUGS THAT ENSLAVE.** The Opium, Morphine, Chloral, and Hashisch Habits. By H. H. KANE, M.D. Philadelphia: Presley Blakiston, 1881.

The author of the volume before us claims that increased mental development among all classes; increased cares, duties, and shocks, and hot-house development of the passions, are responsible for the great preponderance of the nervous element in disease at the present day, and have caused the habitual use of narcotics to become alarmingly common; that pain, nervousness, and hysteria so frequently claim the attention of the physician that, in his efforts to relieve suffering, he resorts more and more freely to opium or morphia, and that patients, experiencing relief from their employment, learn to use them without prescription, and thus unconsciously become the victims of a morbid appetite which binds them in chains which they are absolutely unable to break. For this lamentable state of things the author considers two classes as specially blamable,—physicians and druggists.

The volume treats of the preparations employed, manner of using, symptoms, effects on the system, disturbances from abstinence, and the principles of treatment.

Apart from the effects of the practice upon the nervous system, upon intellection, and upon the various bodily functions, the author claims that there results a moral degeneracy which, even more than physical debilities, should be dreaded. The book should be read by those who prescribe and dispense medicines, and by all who have reason to fear bondage from the use of narcotics.

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## OBITUARY.

**JARED A. PERKINS, D.D.S.**

DIED, at Amesbury, Mass., February 4, 1881, Dr. JARED A. PERKINS, in the forty-fifth year of his age.

Dr. Perkins was born in New Hampshire, in 1836, and his early



years were passed in that State. Dr. Perkins took up his residence in Amesbury about the year 1863. He studied dentistry, and was a graduate of the Pennsylvania College of Dental Surgery, class of 1865. He practiced his profession in Amesbury from that time until his death. Dr. Perkins was a man of simple and pure life; was manlike and cordial in his bearing, and steadfast in adherence to his convictions, though deferential to the views and opinions of others. He was a friend of education, and ever ready to encourage its promotion in every department of life.

#### WILLIAM R. WEBSTER, D.D.S.

DIED, at Richmond, Ind., January 14, 1881, Dr. WILLIAM R. WEBSTER, in the sixty-fourth year of his age.

Dr. Webster had been in the active practice of dentistry for over a third of a century, having entered the profession about thirty-five years ago, at Wilmington, Ohio. He removed to Waynesville, Ohio, where he remained but a few years, and then settled in Richmond, Indiana, where he had continuously resided and practiced for thirty-one years. He was a careful, conscientious, and capable practitioner, and enjoyed at all times a large share of patronage. He was well informed in the improvements relating to his profession, and was a man of estimable private and public character.

#### LANSING B. COOK, D.D.S.

DIED, suddenly, in Geneva, Orange Co., Florida, on Sunday, February 27, 1881, Dr. LANSING B. COOK, aged thirty-two years.

Dr. Cook was born in Sodus, Wayne Co., New York; graduated in 1870 from the Philadelphia Dental College; commenced the practice of dentistry in Buffalo, N. Y., in 1871, where he has since resided until November last, when he went South to spend the winter, hoping to obtain relief, if not ultimate recovery, from a pulmonary affection, which was making itself seriously manifest.

F.

#### DR. I. W. COX.

DIED, at Rheatown, Tenn., January 25, 1881, of heart disease, Dr. I. W. Cox.

Dr. Cox was an esteemed dentist in his locality, taking pains to keep himself well informed in matters of practice. He had just returned from Nashville, where he had been attending lectures. A fellow-practitioner summarizes in reference to him that he was "a faithful dentist."

THE

# DENTAL COSMOS.

VOL. XXIII.

PHILADELPHIA, MAY, 1881.

No. 5

## ORIGINAL COMMUNICATIONS.

### RELATIONS OF THE TEETH AND SURROUNDING TISSUES IN THE CORRECTION OF IRREGULARITIES.

BY J. W. SMITH, D.M.D., NEWPORT, R. I.

(Read before the Harvard Odontological Society, January 6, 1881.)

SINCE the difficulty of correcting dental irregularities increases with age, as soon as it becomes evident that a permanent deformity exists, treatment should be commenced without unnecessary delay. This is appreciated by the dental profession, but, from various causes, many cases are neglected until at or beyond maturity before advice is sought. When thus deferred, the correction of the irregularity is often difficult, and the results of treatment are frequently uncertain. What I have to offer with reference to lessening this uncertainty is the result of some study; limited experience has seemed to confirm my conclusions.

With cases of this class the first difficulty is in moving the teeth at all; and the second is in permanently retaining them in their new positions without the constant aid of retaining appliances. With reference to the first, Dr. Kingsley says that there seems to be no limit to the age at which teeth may be moved. In his "Oral Deformities" he cites a case where a right superior cuspid, articulating inside the lower arch in the mouth of a lady forty years of age, was brought into line in one week. It seems hardly possible that absorption of the anterior part of the process could have taken place in that short time, and I suspect that the alveolar process yielded by bending under the outward pressure. In most cases, however, absorption is necessary if the teeth are moved more than about the thickness of the periodontal membrane. There seems to be no reason for doubting that, under sufficient pressure, long continued, bone may be absorbed and the teeth moved at any time of life.

We have no definite knowledge of the chemico-vital processes involved in the solution of bone under any circumstances. As manifested in correcting irregularities, the process seems to me quite analogous to the absorption of bone during the formation of callus in the healing of bone-fractures. Dr. Theodor Billroth suggests that in this process there may be developed lactic acid, which changes the carbonate and phosphate of lime into soluble lactate of lime, which is taken up and removed by the vessels. But this is only hypothesis.

In practice there seems to be a possibility of correcting irregularities at any age. Admitting this, is there equal certainty that the teeth will become firm in their new relations? Is a new formation of bone sure to follow, in time, and make a success of what otherwise would be a failure? With reference to children, ample experience answers in the affirmative. During childhood, injuries to soft or hard tissues heal more readily, and during the period of development there is more of a tendency on the part of the alveolar process to follow the teeth, whatever position they may assume, than there is in later life. The alveoli are intended for the teeth, not the teeth for the alveoli, and the position of the teeth in the mouth of a child determines that of their bony support. This is not true to the same extent after maturity, as there is then a possibility that the tissue formed behind a moving tooth may become simply a thickening of the periodontal membrane instead of developing into bone. This result would be perfectly analogous to the formation of a false joint at the seat of a fracture. This possibility is one of the reasons urged against attempting the correction of irregularities after maturity, and experience no doubt justifies the objection.

In his work on "Oral Deformities," Dr. Kingsley says that "in hereditary cases of extensive character, which have been delayed until at or near maturity, we can never feel certain but that the original tendency to malposition, so long unbroken, will re-assert itself at any time that we abandon retaining fixtures." During childhood, this hereditary tendency to malposition does not re-assert itself after a full restoration of the alveolar process, and I suspect it would not in the cases to which Dr. Kingsley refers, if the alveolar process were not defective. A fully-developed alveolar process is essential; and these doubtful cases should be conducted with especial reference to this fact.

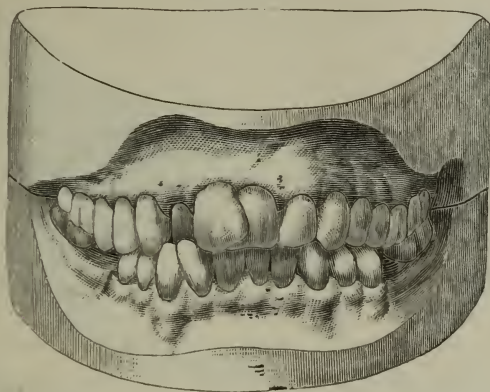
The treatment suggested is embodied in the following:

There is no time of life at which the relative position of the teeth may not be changed by forces naturally existing in the mouth. During childhood, the pressure of the lip may be sufficient to bring into line a protruding tooth after space has been made for it. Later



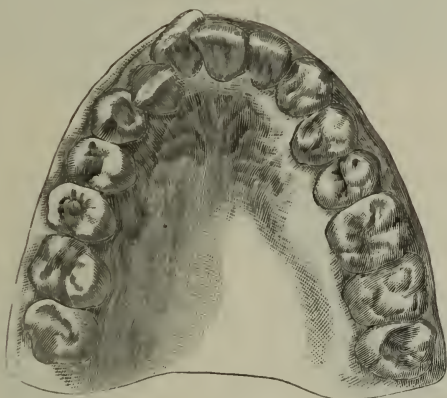
in life, the extraction of a tooth may allow the force of occlusion to move antagonizing teeth; and the loss of the molars and bicuspid may permit the force of the bite to cause protrusion of the superior incisors and canines. In none of these cases is there, from this cause, any lack of firmness of the teeth whose position is changed.

FIG. 1.



The reason for this, it seems to me, lies in the fact that they move very slowly, only just so fast as the alveolar process is absorbed on one side and replaced on the other. Now, by imitating this natural process as nearly as possible, I believe we may proceed with much better prospects of success in cases where there is any doubt as to the result.

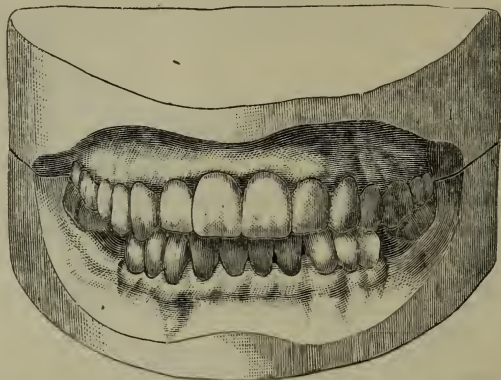
FIG. 2.



Absorption may proceed more rapidly than the new formation of bone, as is proved by the looseness of teeth during the process of regulating, and by retaining appliances being necessary. A degree of irritation, which may amount to inflammation, accompanies the absorption of bone, and which, from analogy, seems to me, at least

likely to be a help to the *deposition* of lime-salts. I infer this from the following facts: irritation of the pulp often causes a deposit of secondary dentine; one mode of treating pseudarthrosis is by rubbing together the fractured ends of bone; and chronic periostitis is accompanied by a formation of new bone. When a tooth is quickly

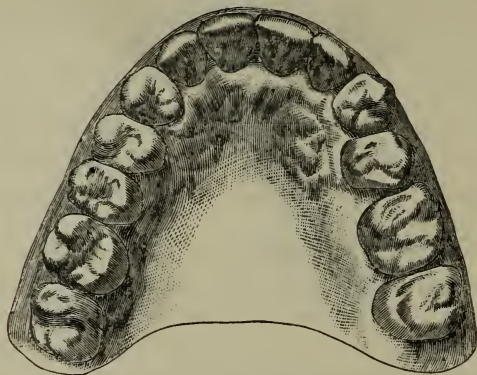
FIG. 3.



moved to a new position and firmly held in place, irritation ceases, and a factor in the formation of bone is eliminated. Now, by allowing more time, the absorption and replacement of alveolar process may progress more nearly in unison, the irritation assisting both processes.

I do not claim that following this plan necessarily insures success, but I do believe it to be more in harmony with natural processes.

FIG. 4.



The teeth are perfectly passive, and some external power must move them if their position is changed at all. Appliances should be used simply as a help to nature. It makes no difference whence the force proceeds so long as it is sufficient in amount. When nature supplies

the power the teeth remain perfectly firm. Now, by imitating nature may we not hope for equally favorable results?

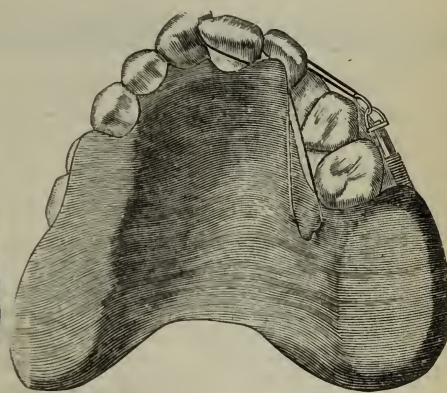
But some may say that there is no danger of moving a tooth in the mouth of an adult too fast, on account of the difficulty of moving it at all. In some cases this may be true. It is very discouraging to work for weeks in trying to devise some form of apparatus that has the desired effect; and at last, when we succeed, we are tempted to hurry as much as possible to make up for lost time. It is at this stage that the theory I have advanced is especially applicable.

I do not advocate attempting the treatment of every case presenting itself at or near maturity, but one is occasionally seen that should receive attention. The extent of the irregularity, the occlusion, and the desire of the patient to undergo treatment must be considered in deciding how best to dispose of any particular case. If, in following out this plan, the time is lengthened, there is at least

FIG. 5.



FIG. 6.



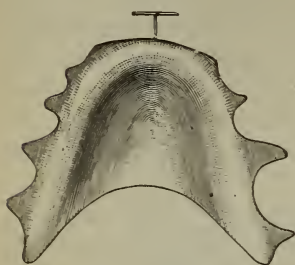
a satisfaction in knowing that a retaining appliance need not be worn for so long a time as otherwise might be necessary. Then, too, success may crown efforts that with less care might have been worse than useless.

In connection with the foregoing, the following case is of interest: The patient was a young lady, twenty-three years old when treatment was begun. Figs. 1 and 2 show the irregularity, and 3 and 4 the case after treatment. The left superior third molar and second bicuspid were first extracted, the former because of extensive caries, and the latter to make room for other teeth. By means of the appliance shown in Figs. 5 and 6, the left superior first bicuspid, cuspid, and lateral and central incisors were moved to the left sufficient to almost entirely take up the space left by the extracted bicuspid,



and enough to make room for the overlapping central incisor. On account of its strength, Japanese grass-line was used instead of silk

FIG. 7.



or linen in connection with the plate and screw. This appliance was entirely under the control of the patient. It was removed once a day for cleansing, and the screw tightened once in twelve hours. Fig. 8 illustrates the key used to turn the screw. The prominent central and the depressed lateral incisor were easily moved by simple means. Five months were occupied in this treatment, but much of the time was spent with ineffective appliances, all efforts at moving back the first bicuspid and cuspid by means of rubber bands attached to a plate proving useless. A retaining plate (Fig. 7), holding in position the right central in-

FIG. 8.



cisor, is all that is now required. It is now ten months since the case was dismissed, and the patient is advised to wear the plate at night only. It has been left out for forty-eight hours without any perceptible change.

## REGULATION OF TEETH MADE EASY BY THE POSITIVE SYSTEM.

BY J. N. FARRAR, M.D., D.D.S.; NEW YORK.

(Continued from page 188.)

### No. XIII.

#### SPREADING OF THE ARCH.

WE now enter upon a phase of our subject which, to me, has been of unusual interest, not only in regard to efforts to surmount mechanical difficulties hitherto only partially overcome, by any form of fixtures, but also in a physiological as well as a pathological point of view. If, in treating the subject, some elementary steps are taken, it is hoped my readers will bear with me, as it seems necessary, in order to carry the minds of some of the younger of them along the line of cause and effect.

Enlargement of the dental arch—sometimes called spreading of the arch—may be arbitrarily divided into two classes. First, the widening of the arch by forcing outwardly only the side teeth; second, the enlargement of the arch by the forcing outwardly, also, of the front teeth. Although the term enlargement of the arch

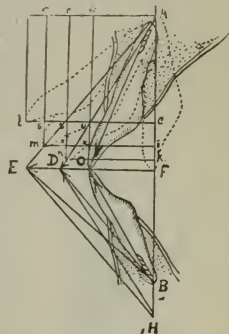
apparently implies the movement of all of the teeth of the jaw, in practice it is not always true, for the outward movement of those of only one side would as truly enlarge the arch as if those of both sides were moved. Happily for the operator, as well as for the patient, most cases do not call for the movement of all the teeth, and very seldom is it necessary to move the molars. This being the case, it will be seen that in treating this class of operations it may be sometimes necessary to overstep the division-lines made in one of my papers (No. IV.) by remarks that may apply quite as well to other classes of operations. It will also be necessary to treat certain points mathematically.

In the proper application of force to the inner surfaces of the teeth lies, of course, the secret of the process of enlargement of the arch. It is not, however, necessary in all cases that the force should be exercised directly behind and on the line of the desired course of the tooth, for teeth often move by a force diagonally applied, as in the case when a device called the "inclined plane" is used. This diagonal pressure on teeth through improper antagonism is well known to be a possible cause of irregularities at every period of life. In childhood this mischief is noticeable in the teeth growing irregularly during the process of eruption, and it is also sometimes shown in front teeth in advanced age, after the molars and bicuspid are lost, which, by being used to do the work of mastication, are forced forward, sometimes causing the lips to protrude.

Fig. 73 illustrates successive changes in the antagonizing angle of central incisors, occurring after the loss of the grinding teeth.

Let us examine into the philosophy of this subject by referring to the accompanying figure, which represents, by plain and dotted lines, the various positions. Through the apices of the roots of these teeth let fall a straight line, AH. At right angles to this line, at the point F, project the line FE, passing between the antagonizing edges of the teeth at the point O. Draw other lines from the apical points, as AO, AD, AE, BO, BD, BE; also, parallel to AF, the lines lp, mq, nr, Ow. Draw, also, parallel to the line FE, others from the cutting edge of the dotted representations of the upper tooth. Since the lines, wO, rn, qm, and pl, are parallel to AF, and cl, im and kn are parallel to FE; then Aw and FO are equal, as is also Ar and kn, and Aq and im; also Ap and cl. It will now be seen that if the antagonizing edges of the teeth should meet at the point F, on the

FIG. 73.

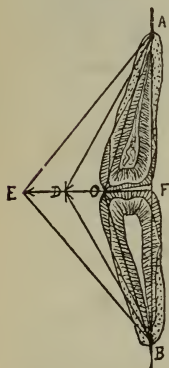


line AH, there would be no leverage, and hence they would not be liable to be forced out of position. But should they meet at any point outside of this perpendicular line, then these teeth, by antagonism, would act as levers upon the sockets, and the oft-repeated force from occlusion would tend to cause each to advance its cutting edge forward towards the point E; and as Ar is greater than Aw, and Aq and Ap are greater than Ar, it will be seen that the leverage correspondingly increases as the cutting edges successively attain the positions shown by dotted lines at the points n, m, l, which may also cause a corresponding increase in the rate of the movement of the teeth.

While great mischief may be done by improper occlusion of the teeth, the cause which occasions it may, in the hands of a skillful operator, sometimes be turned to good account in correcting irregularities. Single teeth may, by a little grinding or shaping, be allowed or caused to take proper positions, and even considerable portions of the arch may occasionally be moved by so shaping the articulating surfaces that they will antagonize on inclining planes.

The entire room necessary for a tooth may sometimes be obtained by simply grinding the cusps and shaping the articulating surfaces of teeth so as to remove the "lock" caused by and during the time of antagonism. This done, the adjacent teeth will sometimes correct themselves without the aid of mechanical devices.

FIG. 74.



Much might be written on the correction of irregularities without the use of fixtures, but, for the present, let this suffice.

An important hint may be taken, in passing, in the matter of retaining teeth in position after having corrected them, by causing their proper antagonism by shaping the teeth with a corundum-wheel, or by inserting properly-shaped *excess-fillings*.

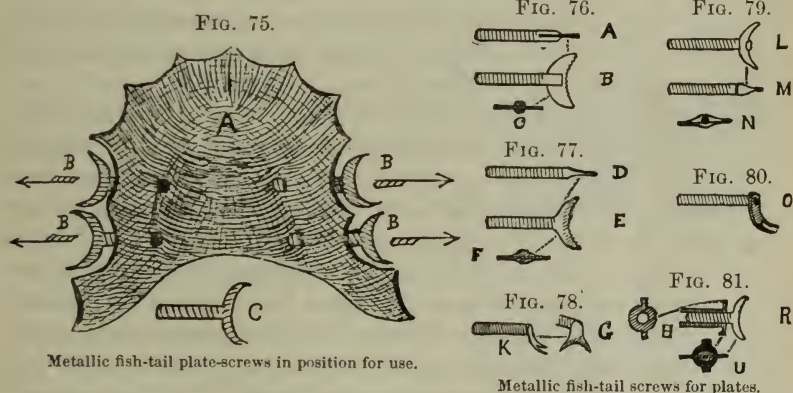
Fig. 74 is an ideal illustration of such a procedure on the principle explained in the preceding figure. The grinding surfaces of two antagonizing bicuspid teeth are ground at such an angle as to cause the point of contact to be as far outside of the perpendicular line, A, B, as possible, thus causing the teeth, when brought together, to act as levers upon the socket-walls, and giving them a tendency, also, to force themselves along the line FE, in the direction of D and E. It will also be seen from this diagram that, if it be practicable, such an arrangement may act in retaining several teeth, or even a large portion of an arch after it has been widened. But, although these conditions sometimes exist, they are



not common enough to furnish precise rules of practice. Beginning with the simplest devices and advancing to the more complex, one of the commonest used in forcing teeth outwardly in detail is the ordinary jack-screw of the depots, illustrated in No. VI., Fig. 23; but, although sometimes useful, I think that in most cases these patterns are not equal to less clumsy ones of cylindrical form, and which are not so liable to be displaced by the tongue.

Another plan, but one which is old and well known, is the use of a hard-rubber plate. For the upper jaw it is generally made to cover the entire hard palate, and for the lower it may be of a U-shape. Of the two jaws, the upper is generally the more easily managed, and, fortunately, it is the one oftenest requiring attention.

In making this form of fixture, the inside of the instanding teeth upon the cast should be slightly cut away, so that when the plate is vulcanized it will impinge tightly upon said teeth, causing them to move until they cease to be acted upon by the plate, when another plate, constructed in the same way, may be made to take the place of the old one. Instead of this changing of plates, however, the better plan is to drill holes into the edge of the same plate and insert wooden fish-tail-shaped pegs, which are made to protrude sufficiently to impinge against the teeth, causing them to move onward until beyond the influence of the device, when the pegs may be ex-



changed for new and longer ones. As this renewal of the pegs is somewhat troublesome, I have abandoned them for little fish-tail-headed screws similarly inserted in the plates, and which may be made to act upon the principle of jack-screws, and are in every respect vastly superior to wood. (See B, B, C, Fig. 75.)

These little plate-screws, which are one-fourth of an inch or more in length, are variously formed, some of them being simply straight

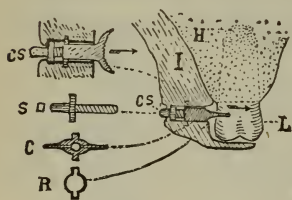
screws with a fish-tail head, flat- and crescent-shaped, so as to fit the teeth, as shown in Figs. 76, 77, others curved (Fig. 78), and of one piece, while others still are jointed (Figs. 79, 80). When needed for use, as before said, these are screwed into round holes, bored in the plate with an engine. When the devices require tightening against the teeth, the plate can be removed from the mouth by the patient, the screws turned, and the plate re-inserted.

The easiest method of constructing these screws is by making the steel jaw separately, and then soldering it in a slot filed in one end of the screw, as shown in Fig. 76. The best and most effective way, however, is to make both in one piece, as shown in Fig. 77.

Besides these simple jacks, I sometimes make use of a ready-at-hand fancy variety. A box jack-screw, Fig. 81, represents a side- and end-view of one form. It consists of a screw, R, set in a threaded box, H. It is shaped like a man's crownless silk hat, the brim of which has two upward projections from its edge, which it is intended should be fitted into corresponding pits made in the edge of the rubber plate to prevent the box from revolving in the socket when the screw is being turned. This device also requires removing with the plate from the mouth in order to operate it.

Fig. 82 represents a similar device, but so differently constructed that it may be operated without removal from the mouth. I, H, L represents the fixture in position in a section of a portion of a plate for the upper jaw; R, C, S, the device in parts; CS, the key-nib by which the device is operated from the lingual surface of the plate; H, the alveolar process; L, the tooth acted upon. While the screw in Fig. 81 advances from the stationary nut, the screw in Fig. 82 remains stationary while the nut (and jaw combined in one piece) advances upon it as the nib, CS, of the screw is revolved by the key. The nut (with jaw combined) is prevented from turning in the plate-socket by nibs projecting laterally from the sides of the nut portion of the box, which slide along grooves made in the sides of the hole in the plate. (Shown by dotted lines in the figure.) To be most serviceable, these screws—and especially the jaw portion—should be of steel, nickel-plated. The entire instrument should be only about one-fourth of an inch in length when closed in ready for use.

FIG. 82.



combined) is prevented from turning in the plate-socket by nibs projecting laterally from the sides of the nut portion of the box, which slide along grooves made in the sides of the hole in the plate. (Shown by dotted lines in the figure.) To be most serviceable, these screws—and especially the jaw portion—should be of steel, nickel-plated. The entire instrument should be only about one-fourth of an inch in length when closed in ready for use.

Although the last-described devices are occasionally convenient because they can be operated without removing the roof-plate, these apparatus have the disadvantage of being difficult to cleanse, which, coupled with the difficulty of manufacture, renders them of less

value for general use than the simpler forms shown in Figs. 76 to 80, which are not only easy to make, but readily cleansed. Under what circumstances these devices can and cannot be used will be shown in the following paper.

(To be continued.)

## THE ONE THING NEEDFUL FOR THE DURABILITY OF FILLINGS.

BY C. A. BRACKETT, D.M.D., NEWPORT, R. I.,

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(A paper read before the American Academy of Dental Science, at the annual meeting in Boston, October 27, 1880.)

At the outset, I wish to say, plainly, that I make no claim to originality for the matter here presented. Every point that I hope to make has for a long time been thoroughly familiar to you; and yet, so far as my listening and reading have gone, there has not been quite the same grouping of facts that I here make. You will see that the same little bits of glass are in the kaleidoscope,—only a slight new turn is given it.

There is "one thing needful" for the durability of fillings; and I am so impressed with the soundness and common-sense character of this postulate, that I shall feel in presenting it that your assent will be given; and this, too, in view of the fact that some think that gold is the best thing with which to save teeth, and others that "in proportion as teeth need saving gold is the worst material to use;" that "some have faith in contour, and others have faith in separation;" that one ascribes failures to "defective manipulation," and another to "incompatibility of filling material with tooth-bone;" and so on.

In honest search for truth, and in order that our patients might have as intelligent and conscientious service as possible, I suppose we have all pondered much over these conflicting theories. In my pondering it has come to seem that the conflict is mainly superficial, more apparent than real, and that there is a harmony and unity of principle between the theories of Arthur, Atkinson, Bonwill, Chupain, and Webb. In one way or another they have all recognized the one thing needful for the saving of teeth. This one thing needful cannot be more definitely expressed than by the phrase, "changed conditions," basis of durability.

Cavities of decay may be classified under a few general heads. It is sufficiently discriminating for our present purpose to make only three of these: the first including crown cavities; the second, labial, lingual, palatal, and buccal cavities; the third, approximal cavities.



Without going into any profound theories of the primary causes of caries, we recognize certain grave approximate causes that in this connection are quite as practical for us to consider. Brief statement of these must be the stepping-stone to the explanation of the theory of treatment.

Let us begin with the simplest division,—crown cavities. Concisely stated, they usually depend for their existence upon two circumstances: first, imperfection of formation, a want of coalescence of the enamel prisms in the pits and sulci; and second, the mechanical retention in these pits and sulci of agencies whose chemical properties favor decay. Such cavities, we all know, when filled, give the largest percentage of successful and durable results. The reason is that we are easily able to abrogate all of the causes that led to the inception and progress of the decay. Merely sealing the properly-prepared cavity in the simplest way with an appropriate material accomplishes all.

Here let me say that this paper has nothing to do with the relative merits of the different filling materials. We have all come to know that every one of them has its appropriate place, for which it is better adapted than either of the others. The good student can readily make a categorical statement of the properties which a filling material for a given case should possess, and of the principles which should govern its introduction. So let us understand, once for all, that when we are speaking of the filling of cavities we are speaking of doing it with that judgment which selects a proper material, and that skill which introduces it as nearly free from imperfections as possible.

With the class of crown cavities we may legitimately place such palatal cavities in upper incisors and upper molars, and such buccal cavities in both upper and lower molars, as are dependent upon precisely the same conditions,—primary defect in enamel-structure being at the foundation.

The labial and buccal cavities in the cervical region are another thing. In their location the original formation is usually perfect; and the decay is brought about through continued contact of obnoxious oral fluids, or the *débris* of food, or both. Such cavities most often appear where the lack of cleanliness is greatest,—the buccal side of the third molar, near the gum, quite frequently affording a typical specimen. The relation of the cheek in many mouths is such that unless extreme care is taken there is hardly a time when decomposing particles of food are not in contact with this surface. The decay is as legitimate as is the result of any other chemical action. Sometimes—particularly about the upper front teeth—a favorable site for this decay is provided by the injudicious use of

the brush. There is produced such recession of the investing tissues as to expose a portion of the tooth not intended to be exposed,—a portion not covered with enamel, and endowed with less resistive capacity. In addition, the conformation of the tooth at this point favors the retention of the destructive agencies.

In applying the principle of changed conditions to all of this class of cavities the details of accomplishment have usually to be more extended than in the first instance. It will often be found that filling materials with qualities other than those most efficient in crown cavities will here render the best service; and we have usually to supplement the sealing of the cavity with further treatment in order to secure anything like permanency in results. Bulbous crowns and projecting shelves may have to be ground away in order to assist in preventing the retention of deleterious agencies in contact with the filling and the surrounding tooth-tissue. The patient must be intelligently and persistently faithful in the use of the most appropriate means and methods of maintaining cleanliness; and we may have to resort to local and perhaps systemic medication to correct the destructive tendencies in the oral fluids.

In the third class, approximal cavities, we have to deal with circumstances requiring our highest skill and the most intelligent application of "the one thing needful." My faith in the wisdom of the Creator is such that I believe that so long as man lives as he was intended to live, the natural conformation, arrangement, and juxtaposition of the teeth are the best that could possibly be contrived; but this does not necessarily hold true under abnormal conditions,—such abnormal conditions as exist in the cases of all our patients and operate in the mouths of nearly all of them. That which is perfectly suited to the strong man in robust health may be illy adapted to the same man when he becomes an invalid. In the treatment of approximal decay we have not only to look out for securing such changed conditions as have already been mentioned in connection with simpler cavities, but we must also have regard to the additional accident of inter-juxtaposition and its consequences. That the contour of teeth at and about their points of contact is favorable for the retention of fluids without much or frequent motion is readily made apparent. To many the old illustration of Dr. Riggs is familiar. Upon a thatch or a stack in a rain the drops of water accumulate at points where the individual straws approach each other; as they recede, the water is unable to retain its position and runs off. If the oral fluids, from their inherent character, or from contamination with the products of decomposition of food-*débris*, have a corroding character, these points of contact suffer, and decay results. If, while the cavities are still quite small, the

teeth are pressed apart to secure access, filled perfectly, and allowed to return to their former positions and relations, it will not ordinarily secure permanent exemption from the further progress of decay. This is emphatically true of the teeth of children and youth. Unless more decidedly changed conditions are in some way attained, we may be pretty sure of recurrence, and that, too, after a not very long interval. The sealing of these small approximal cavities does not in itself accomplish the same change of original conditions that sealing the crown cavity accomplishes. If the contour of the parts and the condition of the fluids remain unchanged, the tooth is probably quite as likely to decay again as in the first instance, because the joint between the filling and the cavity-wall, however perfectly made, is more vulnerable than the original unbroken enamel surface.

However, there is in nearly all cases, except those of senility, one circumstance in our favor, viz., the increased density and resistive capacity of tooth-structure that comes from added age. In a more restricted way the operative dentist has something of the same help from this circumstance that the physician has from the peculiarity of self-limitation in a large percentage of the affections which he is called upon to treat. This natural increased density and increased resistive capacity of teeth, as the patient grows older, is one of the most important elements that go to make up the essentially changed conditions of which we speak. Through this beneficent provision, and by temporizing for some years in the beginning, we may ultimately be rewarded with the most gratifying success, where otherwise must have been only unhappy failure.

But cases occur in which all that has been enumerated in the way of changed conditions is insufficient to make approximal fillings prove durable. Then there are the added resources of separation, and broad and exaggerated contour. Ordinarily these are looked upon as having no fellowship with each other; yet the object which they seek to attain, and which each in great measure does attain, is one and the same. The essential idea with each is to accomplish the desideratum of our text.

It cannot be, with the earnest, practical men who are arrayed on both sides of this great question of contour *versus* separation, that the truth is all on one side. Each of these systems of practice has its merits and advantages and legitimate adaptability to individual cases as they arise,—the cases of individual patients, and the cases of individual teeth, perhaps, in the mouth of the same patient. In the good judgment to properly apply it lies much of the excellence of each principle.

It is not part of the present purpose to enter into the details of making either contours or separations, except to say that it requires



most intelligent and experienced discrimination to do either with the best results. Separations, in particular, have to be made most skillfully, and with careful regard to present and contingent play of forces; or from the impaction of food, the retention of deleterious agencies in contact with cut or ground surfaces, or at angles, or at the cervices, or from the turning of the teeth on their axes, there may result a latter condition of things worse than the first.

From experience in my own mouth, and from years of observation in the mouths of others, I was long ago forced to the conclusion that the average contour, while it lasts, is a very much more comfortable and satisfactory thing for the patient than is the average separation. That it may last well it is necessary that it should be so made as to in itself constitute a materially changed condition. This may usually be done in one of two ways: the cavities may be cut out broadly, so as to include such portions of the approximal surfaces that the edges of the fillings are left free all around; or the same object may perhaps oftener be quite as well obtained by exaggerating the original contours of the teeth, so building out the fillings that a prominent knuckle of metal on one side shall, after recovery from the wedging, impinge against another prominent knuckle of metal on the other side, while all those portions of the approximal surfaces not covered with filling material are left entirely free from contact.

Of the controlling power of changed conditions we have a good illustration in the results of the judicious extraction at the right time, in cases requiring it, of the sixth-year molar. Those who did such things years ago and have kept sight of their patients, have usually been gratified to find an exceptionally small amount of after-attention required. So, too, every one is familiar with the arrest of shallow approximal decay in adult life through extracting the next tooth.

But we need go no further in detailed applications of our proposition, or in proof of its truth and soundness. A foundation principle—we may say *the* foundation principle—of all therapeutic practice directs the removal of the cause or causes. Make it or them cease to operate, and we have gone a long distance towards securing recovery.

Dental caries is a lesion of tissue dependent upon certain conditions which we recognize as causes. For the most successful treatment of the lesion it is necessary that there should be an intelligent appreciation of those conditions, and skilled work of the head and the hand in abrogating them. There must be hearty, constant, persevering co-operation on the part of the patient. We must ourselves make judicious choice of filling materials, and insert them

with all the painstaking thoroughness requisite for the complete obturation of the cavity of decay. We must so arrange contours and spaces as to provide as well as possible for self-cleansing or easily-cleansed surfaces; and particularly must obnoxious chemical properties in the oral fluids be corrected or persistently combated. The golden text for the dental operator should be, "change the conditions."

### THE PROPOSED MOVEMENT ON THE AMERICAN MEDICAL ASSOCIATION.

BY T. C. EDWARDS, D.D.S., BROWNSVILLE, TENN.

UNDER the caption of "The Position that Dental and Oral Surgery is destined to Occupy in America," there appeared in the DENTAL COSMOS for March a paper advocating a movement by which all regular physicians practicing dentistry are to secure representation in the American Medical Association. Such practitioners are advised to join their county medical society, and present their credentials therefrom to the American Medical Association, which meets in Richmond, Va., in June next, the purpose being to form a section on dental and oral surgery, and thus place dentistry as a specialty side by side with other special branches of medical practice.

It seems to the writer that such a procedure is open to numerous and serious objections. In the first place there is too much appearance of haste, too little time for discussion among practitioners of dentistry. Again, the local medical societies may not elect to send these new members as delegates; the American Medical Association may not consent to the formation of such a section, and possibly even the "medical men" who are practicing dental and oral surgery may doubt the propriety of submitting their claims to the decision of the Medical Association just yet. In fact, there is a strong probability that the scheme will not succeed if attempted in the manner proposed, and for one I sincerely hope that it may not. It is hardly reasonable to expect any considerable number of dental practitioners to look with complacency upon such a dubious method of presenting their claims to the notice of such a dignified and conservative body as the American Medical Association.

There is a wide field for discussion as to our relation to the medical profession, and there are wide differences of opinion not only among medical men, but among dentists themselves in regard to our status; and these differences are not likely to be set at rest by the recognition of medically-educated dentists by the American Medical Association. Gentlemen of our profession who have secured position

in this honorable body have not done so by virtue of their special degree, but from the fact that they were graduates in medicine. In the proposition under consideration no claim is advanced for our own special schools, which have made dentistry what it is to-day,—they are quietly ignored.

It is not my purpose here to discuss the merits or demerits of the dental colleges, but it would seem that, instead of ignoring them and those who represent them, we should, remembering how much they have accomplished, be ambitious to make them more efficient, and still more deserving of support. If they are not what they should be, let us help to make them so. No one will claim that the medical schools are all that could be desired. There is room for reform all round. There have been too many instances in which the dental schools have been used merely as stepping-stones to medical degrees by those who afterward turned their artillery against them. When, as practitioners of an honorable and useful profession, we secure such recognition from the medical profession as we are entitled to, we should also secure a like recognition for those institutions which have contributed so much towards making us what we are, and which are so absolutely essential to the future advancement of our calling. For a few to go into the American Medical Association, leaving the great body of the members of their own specialty, together with their special schools, outside, would be a serious mistake. The gentlemen would find themselves to be representatives without a constituency, except, perhaps, a little coterie of “medical men” practicing dental and oral surgery. The great mass of dental practitioners will of necessity remain just where they are. It would then remain to be decided who is foremost in progress towards the goal for which we are all striving,—the best preparation for our special practice.

The whole proposition, it seems to me, is a misconception, ill-advised, and premature in the extreme. It will excite opposition,—indeed, the writer of the paper confesses that he expects opposition,—which would do his cause and ours too great injury, besides engendering antagonisms in our own ranks which would damage us greatly.

We suggest that this scheme had better be dropped for a while. Let the discussion go on among ourselves, and when we have crystallized into some semblance, at least, of harmony, it will be time to submit our claims to the American Medical Association. Let us not invite rebuff by too hasty action; but, by a manly and earnest support of our vocation and of its schools of instruction—not only for what they have been and are, but for what we can make of them in the future—make ourselves respected by the public and by the



medical profession. We have grown strong and even respectable without the guardianship of the medical profession, and we may hope to continue to grow awhile longer without it.

If there are men in our profession who desire to be heard in the councils of the American Medical Association, its doors are always open to those who have a medical degree. If they have any scientific information to give, let them attend the association not as the representatives of a specialty, but as specialists if they choose, and they may thus help to bridge the chasm between dentistry and medicine, and so prepare the way for a fuller recognition when circumstances may seem to make it desirable.

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## PROCEEDINGS OF DENTAL SOCIETIES.

### NEW YORK ODONTOLOGICAL SOCIETY.

REGULAR meeting held at the residence of Dr. W. A. Bronson, Tuesday evening, January 18, 1881.

President, Dr. Bronson, in the chair.

#### *Discussion of Dr. Niles's Paper.*

Dr. George A. Mills. I am extremely thankful to Dr. Niles that he has taken this interest in a matter which has engaged my own attention for a considerable period of time. It is a matter that has been of growing interest with me as I have become better acquainted with it. I have talked in my own way a good deal on this subject, but I confess that when I first gave it my attention I had very little knowledge of its general characteristics, and I had but little help in gaining an understanding of the basal principles which underlie this disease and its treatment. The experience I have had enables me to boldly claim that I have some special knowledge of the characteristics of this peculiar disease in the mouth, and know something about the efforts that are being made and the treatment applied, and its results. Dr. Niles, as I said, has taken interest enough to make some investigation in connection with it, and you are the happy recipients of the results of his work. I regard his paper with a good deal of favor from this fact, although I largely disagree with the points he has urged. We are benefited by the discussion, even if we do not agree with all that may be said on the subject. From his investigations it seems that Dr. Niles has concluded that there are persons who are predisposed to the deposit of the phosphate around the teeth. So far as I followed him I was not

able to see that he brought out any thing new, as I understand it. There is a question involved in regard to the matter of diathesis upon which I do not know that I am fully able to express myself as I desire to. I agree with the idea that there is predisposition in some persons to certain conditions. I know there are persons who are predisposed to certain ailments that are not entailed upon others. It is a question with me with regard to this deposit of lime about the teeth,—whether it is locally caused or the result of a general diathesis. Dr. Niles makes the claim that the primary cause of inflammatory action is the deposit itself. I entertained that view myself, but without knowledge. I made that statement in the first article I wrote, and I fell into the idea that Dr. Riggs expressed, but I think I understand myself now well enough to say I am perfectly satisfied that that is not the primary cause. It is a *result*. The primary cause, as I have stated to the profession, is systemic. Dr. Niles's idea, according to my understanding, is that the lime deposit was the direct cause, and yet, as you follow him in the statement, he speaks of the six hundred cases he had the chance of investigating, and says the majority of them were of marked debility, and he uses the expression that the rest of them were not very well. My understanding is that the disease is caused by debility. It is in the being, *in esse*, in the organization. He holds that the lime deposit is the cause of the inflammatory action, while at the same time he admits the abnormal condition. On the other hand, I make the claim, that the first expression of debility would be in the margin of the gum. If disease exists about the teeth, there must be systemic disarrangement; you cannot get the excitant and inflammatory action otherwise. The cause lies back in nervous degeneracy, producing the lowering of the tone of the system,—loss of nerve-power, —and that acts upon the breathing apparatus.

Dr. Niles. Do you mean to say that “debility” or a disease occurs in the gum and alveolus primarily?

Dr. Mills. I mean that the first expression of disease is made known at the peripheral margin of the gum. Unless there is debility there you do not get the pocket for the deposit in the first place. There is where the trouble commences. The loss of nervous power in the system admits of the possibility of a condition lowered from the normal standard. To go back to the idea that the lowering of tonic by the loss of nervous power acts directly upon the breathing apparatus, every man knows, of course, that you take a drum and snare it to get tone. You unsnare it, and you get a loss of tone. It is the same in regard to our constitutional arrangement. Every one in low tone needs some kind of a tonic. By the letting down of the nervous system the action of breathing is changed, and

necessarily the length of the breaths is made shorter. In short breathing we get an abnormal state of things; if the system is up to the normal tone we breathe properly, and get the full supply of oxygen from the air into the blood, which is oxygenized by the oxygen being carried into it. As the nervous system is let down there is depression just in proportion, and it suffers by loss of the propelling power of the blood-column through its capillary system. I have never yet seen a marked case in which the patient has not lost inspirational and aspirational power, and is correspondingly depressed. If the action of the heart is lessened in its propelling power, it stands to reason that the flow of blood throughout the channel where the blood goes falls short; it falls short in the capillaries, and it is a lack of the action of the heart to force the blood to them that causes this collapsing at their extremities. I have taken this ground on the basis of thinking that the calcareous deposit was simply a secondary result. There is an evidence of debility in the fact of the deposit being in the mouth. It is generally understood that the secretions of the mouth are both acid and alkaline, and that they become neutral in the normal condition. In proportion as the system is dropped down, the equilibrium of the saturated solution is lost, and the moment the standard is lowered a precipitate takes place and the lime drops to the bottom, just as Dr. Niles illustrated by the bottle of lime-water. The abnormality of the system gives that expression that it admits of the possibility of the deposit of lime. Since the last meeting was held, I chanced to be in the Mercantile Library, and looking at the *Missouri Dental Journal*, I found in the November number a report of some remarks made in the Illinois State Society by Dr. Ingersoll, which I give for what they are worth. He took the ground that the calcareous matter was present in all the secretions of the body, and claimed that the deposit in the deep pocket around the tooth, as we find it, was the result of the change taking place in the blood caused by inflammatory action. He uses the term "sanguinary deposit." That was a new thought to me. Whether that is sound or not, I do not yet know. I have not given it attention, and I do not know that I would be able to say yes or no. To make myself a little plainer in regard to the particular points of the etiology, I will refer to what I have said in the August number of the *Practitioner* for 1880.

I want to criticise one or two remarks that Dr. Niles made use of at the last meeting, and I am very glad he is here. He confessed he had had very limited time for the investigation and observation of this disease, and he was frank enough to say that he agrees with Dr. Riggs that the calcareous deposit should be removed surgically;



but he says, also, that you cannot do it. I claim that it *can* be done by men who are expert. Further, he only half stated Dr. Riggs's position. Dr. Riggs says it must be taken off surgically; and he has pointed out the peculiar conditions in connection with the alveolar process, and has claimed that it was necessary to remove the necrosed edge which he was first to describe; furthermore, he claimed that a principle as old as surgery must be applied, namely, when the line of demarkation was discovered it was necessary to remove the dead tissue to set up a healthy action. That was the point I wanted to bring up; as Dr. Niles only half stated it, I wanted to make known what Dr. Riggs claims. On the point made by him I am perfectly satisfied that the question is settled for all time. I have the confirmation of Dr. Atkinson, who has demonstrated to us repeatedly that this same condition exists in alveolar abscess, and that it only wants a man who has the judgment to find and surgically remove the necrosis to effect a cure. I have made a challenge for any one to refute the statement of Dr. Riggs. I was unable to find the point made in any of the dental literature. I was not positive it was so. Since the publication of my articles, in which I made the challenge, Dr. Garretson, in speaking of the application of the engine in surgery, makes this statement: "It is necessary to remove the circular edge of the process to secure healthy action;" and describes how it can be done by the bur. I do not wish to be understood, of course, as claiming that the necrosed edge or the edge deprived of nutrition is apparent in all cases. We recognize different stages of the disease. There are a good many cases where the process is not approached, and it is not necessary to work much in that direction. I hold, as Dr. Riggs has claimed, that a great many cases are undertaken to be treated by men in a superficial way. I know men who are careful in these things. I except such men, but I speak of the mass of the profession. This matter has been gone over superficially and looked upon as simply removing tartar. The time *will* come, and it is coming *very fast*, when men will take an interest in it and be anxious not only to take care of the cases, but they will come to observe that the results are so terrible in the mouth and upon the health of the tissues generally, that they will anticipate cases, knowing that prevention is better than cure. The time will come,—soon or late, just as stimulus is brought to bear on the profession. I say here, as I said in Boston last summer, that I don't think we have reason to expect very much from the older members of the profession. There are many men among them who will do good, but from the efforts of the younger men we are to hope for the best results. I am very glad to find some of that kind already who have given

me evidence of this, and who have quite an intelligent understanding of what they are about.

I will say a word in regard to the treatment I practice, *à la Riggs*,—so far as instruments are concerned, “they are in my hands satisfactory.” I am ready to adopt anything else as soon as I find something better. In my own hands the results have been favorable to so large an extent that I can say I am more and more encouraged.

I do not wish to be understood as claiming that I am successful in every point, but that I am successful in a large degree; and my observation has shown this, that as my confidence, knowledge, and experience increase, I am able to take hold of cases that I formerly would not. There is another point, and I am indebted to Dr. Atkinson for it. There is a large number of cases which are extreme, where there is a loss of teeth, or loose, very loose ones, and I have found that, by Dr. Atkinson's practice of supplying the loss by artificial teeth, so that nature is brought into a state of rest by the restoration, helping the teeth by the support of a properly-constructed plate, an immense amount of advantage can be gained, and the most marked results have been obtained with Reese's metal by both Dr. Atkinson and myself. We have found that to be the best thing out. I have had some very interesting cases in this line. There are points that were raised by Dr. Atkinson at the last meeting in regard to the reproduction of the process, gums, and pericementum. Dr. Niles raises a question of doubt. The question comes to my mind: We all know that reproduction of the alveolus is possible, and of bone in different parts of the system; it has been proved that gum, nerve, and other tissues have been reproduced. If this can be done in the gums, the nerves, tissues, etc., why can it not be done in the pericementum? I look upon one as being as rational as the other.

Dr. J. M. Howe. This subject is a very interesting one, and I thank Dr. Niles for the care and study he has devoted to it, and I congratulate him upon the new lines of investigation he has taken up, and which I hope he will still further develop. However, there were one or two points which he made in his paper that I have some doubt upon. I do not wish to be understood as expressing myself positively, for I do not feel that I have had sufficient experience in the treatment of the disease to be positive at all, but still, I have for several years treated quite a number of cases, and have come to some conclusions as to probabilities. Dr. Niles makes the points that the inflammation and local conditions are caused by the calculus, and that the calculus is not a product of the disease. Dr. Mills has discussed that subject, but he has not dwelt upon some points that I expected he would have considered. I don't suppose Dr. Mills or anybody else

would doubt for a moment that the deposit we generally find upon the teeth at the margin of the gum is a deposit from saliva, directly, and that in the larger number of cases it is the cause of the first local irritation. There is, however, a troublesome class of cases that we have to deal with, in which we do not find much, if any, deposit of tartar upon the crowns of the teeth themselves. Most of the teeth in this condition are passed over, I am sorry to say, by a majority of the members of the profession with the assurance to the patient that the mouth is in a healthy condition; but those who have some knowledge of these conditions and make examinations carefully, see at a glance a purple hue of the gums either here and there in spots, or perhaps running in a line, causing a thickened or welt-like condition of the festooned border of the gum. We see no tartar, no deposit on the teeth, but we find pocket-like separations between gum and root, the alveolar tissue wasted away, and in the deeper parts of these pockets, with the instrument we find granular masses firmly adhering to the root; or where we have the purple-thickened margin of gum, a line of hard, dark calculus incrustated upon the roots, from one to two millimeters beyond the free margin of the gum. It has seemed to me that the conditions just described, together with the fact we have all no doubt observed, that these deposits in the pockets, and in linear arrangement from tooth to tooth, very often occur in the most remote localities possible from the orifices of the salivary ducts, tend to confirm the idea suggested by Dr. Peirce, of Philadelphia, several years ago, which, I believe, was that in inflammatory condition of the pericementum causing extravasation of serum, the latter would leave lime-salts as a deposit when it was re-absorbed. I have no doubt that if this inflammation or congestion does exist before the deposit, it is a result of a peculiar tendency of the system, which may, for want of a better designation, be classed, according to Dr. Mills's idea, as debility, or nervous lack of tone.

Dr. Mills. You recollect I referred to that idea as coming from Dr. Ingersoll.

Dr. Howe. I did not understand it to be the same suggestion, but if any credit is due for that suggestion it belongs to Dr. Peirce, who made it several years ago. There is nothing strange if this does turn out to be the fact, any more than that in a gouty diathesis local expression takes place in inflammation, and finally in deposits of inorganic matter—tophus—in the knee- or big-toe-joint. The nervous debility or the uric acid diathesis is locally developed according to the characteristic tendency of the disease, and I have a pretty firm conviction that there is a peculiar liability in the systems of some people to this peculiar inflammation in the pericementum.



tum, and that as a result of that there is first deposited a calculus, which in turn becomes an irritant and local cause of more deposition. If we remove this local cause we palliate the trouble. We don't remove the predisposition, but if we keep at it and properly instruct our patients they may by that means keep their teeth and their mouths in a healthy condition. Dr. Niles has not specially pointed out the condition illustrated by these cases, nor the marked difference between these, in which we see no tartar on the teeth, and those other cases in which we easily see more or less in most abundance opposite the orifices of the salivary ducts. I think there is room for considerable doubt whether it has been proved that the original cause is always calculus, or whether the calculus is not sometimes caused by something else than saliva.

Dr. Niles. In answer to Dr. Howe I will read a portion of the paper which I presented at the last meeting:

"It may be asked, How shall we account for the nodules on the root of a tooth in a pocket formed by it and the surrounding tissue? This may be explained in three ways: First, they may have reached there by mechanical means from the saliva. Or, second, as has been said, pus and serum contain a small amount of lime-salts. The root of the tooth, with the periodontal membrane destroyed and surrounded by inflamed, exudating, irritated tissue, would represent almost the same conditions. Third, Billroth, in his work on surgery, speaking of chronic periostitis, says that there is often present a nodular osseous deposit, situated at the point where a blood-vessel enters the bone. This would indicate that the periosteum, being thus irritated, had made an attempt to resume its embryonic power of bone-formation at this point. This seems to furnish the best theory for the origin of nodules on the cementum. They would be deposited at the time the inflamed and receding periodontal membrane was at this point."

In another part of my paper I gave the analysis of pus by Robert Druitt, in which he says there is but little or no phosphate or carbonate of lime in pus. Serum from the blood would doubtless contain some of the salts found. As regards free uric acid being formed or secreted there, it would have a tendency to dissolve this deposit, as it is soluble in acids. Urates are found in acid solutions. In reply to Dr. Mills I will say, that in those who applied to the Massachusetts General Hospital for treatment, in six hundred examinations I did not find one case of which it could be said that calculus was not or had not been present at some time, while there were one hundred cases which showed abundant proof of its presence. Dr. Mills says "debility" is the exciting cause of salivary calculus. But we find comparatively healthy and even robust persons have the affection. Here allow me to call your attention to this word "debility," which Dr. Mills uses indiscriminately. "Debility" refers to a more chronic and lasting depression of the system than is often present. For instance, temporary nervous excitement is not debility.

Fatigue or exhaustion from overwork is not debility. Girls, between the ages of twelve and twenty, sometimes present quite an aggravated condition of inflammation of the gum. But the system overcomes this tendency as it becomes accustomed to the depression which visits the economy about that time of life, and the solutions of lime are used up. People subjected to temporary nervous excitement present in a great many cases an abundance of lime-salts in the urine; there being no nucleus upon which the salts can accumulate, or, this fluid being acid, they pass off in solution; the secretions of the mouth, normally, are neutral or slightly alkaline, and will admit of their precipitation, and there is usually a nucleus at the point where the cementum joins the enamel. I cannot agree with Dr. Mills that local disease is the exciting cause, though the point is a very difficult one to prove as to what time pathology of the gums sets in, and at just what time the lime-salts are precipitated. I have not found a case where there were inflamed gums and no evidence of a deposit of lime-salts at some time. The salts may not always be readily apparent. I have here some lime-salts precipitated on the inside of this test-tube which, you observe, are white, or the color of a tooth. When the periodontal membrane is destroyed, the salts will collect at first in fine white granules, and are not apparent to the eye, especially on a tooth of the same color; for this reason I said it was very hard to go around the whole contour of a tooth with a sealer and be sure that the deposit had been all removed. You can readily see how difficult it would be for you to go over the convex surface of this test-tube and remove all that deposit with your instrument. Surgical treatment, therefore, in my opinion, is insufficient. I agree with Dr. Riggs so far as removing the pathological incrustations and dead material is concerned, but I think we should meet with better success if something had been applied to the root of the tooth, and the possible remaining salts dissolved away. I would like to ask Dr. Mills the names of those glands in the mouth that secrete acids, and what those acids are?

Dr. Mills. I have not gone into the chemical analysis. I have simply taken the general statement that we know. I never have seen it denied. Dr. Atkinson has made the statement, and I have taken his word.

Dr. Howe. I do not exactly understand whether Dr. Niles intends, in that portion of the paper just read, in which he refers to nodules of calculus upon the roots, to attribute their presence there to the serum of the blood directly or not; if such is his meaning, it seems as if what I understood to be one of the important points of the paper, is in that very fact called in question. As I understood him,

the inflamed condition manifested in this disease is caused, primarily, by the deposit of calculus, and the calculus is not a product of the disease. The point I made was that, primarily, the deposit on the roots of the teeth is probably the product of the local inflammation, and not the exciting cause of it, in those very cases of which I spoke.

Dr. Niles. The abstract of my paper which you have, at the time it was made was not intended to come before this meeting. By reading the paper you would be able to see how the point was stated. Primarily, the deposit occurs about the necks of the teeth. As this irritates and inflammation progresses, the deposit of nodules on the root occurs from the effect of this condition. The deposit around the cervical portion of the teeth is the local exciting or primary cause which produces all the pathological conditions present.

Dr. Howe. I am glad this was brought out, and, so far as I was mistaken in the intent of the essayist, I am happy to be corrected. I am glad we come closer together in our views. It seems very probable to me there are two ways in which this disease may progress, but the condition I have especially referred to has seemed to me to be the one which was most difficult to deal with.

Dr. Bogue. I would like to inquire of Dr. Niles whether I correctly understand him that saliva is always neutral or slightly alkaline?

Dr. Niles. Normal saliva, when secreted in abundance, is neutral or slightly alkaline.

Dr. Bogue. I would ask whether that is the result of recent tests or generally received opinion?

Dr. Niles. I have made tests of it. There is an acid condition when fermentation of certain substances is taking place. When saliva is secreted in abundance it is normally neutral or alkaline.

Dr. Mills. What is healthy saliva?

Dr. Niles. By chewing a piece of rubber and expectorating the accumulation you will get normal saliva.

Dr. Bogue. Have you made tests just before and just after chewing?

Dr. Niles. I have; and have found an acid condition about the mouth before, but the freshly secreted has always been alkaline or neutral.

Dr. Bogue. As I understand the paper, while there is not absolute assertion, the author pretty strongly inclines to the view that salivary calculus is the cause of the disease under consideration, generally called, and I think very improperly, Riggs's disease. It should be *pyorrhœa alveolaris*.



Dr. Niles. It is, in my opinion, the precipitate which produces the pathological conditions present.

Dr. Bogue. It has so seemed to me for many years, without the careful investigation that Dr. Niles has gone through with, and for which I feel deeply grateful, but there is a practical bearing which we Americans are very apt to seek; I think, whether salivary calculus be the cause or the effect, we may safely make the deduction that if we can so conduct ourselves as to keep entirely free from salivary calculus, we shall be free from inflammatory action at the margin of the gum, and from inflammation of the investing membrane of the root of the tooth; and it would seem as though Dr. Niles might have added that with propriety, although he seems to have shrunk from so doing. I should like to ask one other question, Whether Dr. Niles has seen the deposit of these nodules of salivary calculus upon the roots of teeth never erupted, and which were in a closed sack at the time they were taken from the mouth?

Dr. Niles. I never have; but I have seen musket-balls imbedded in the flesh that were enveloped in an osseous coat.

Dr. Bogue. Was the composition of that coat the same as salivary calculus?

Dr. Niles. I do not know; I have never had an opportunity to test such deposits.

Dr. Bogue. What is the practical conclusion from your labor, so far as you have gone, in reference to treatment, prevention, and what we might call cure of this disease?

Dr. Niles. I gave my conclusions, so far as my knowledge of the cause had suggested, in my remarks one month ago. The treatment of this trouble requires as much, and perhaps more study, than the etiology. I can therefore give you nothing conclusive. I know very little, practically, about the treatment of phosphatic and calcic diatheses.

Dr. Mills. Dr. Bogue says he does not know why it should be called Riggs's disease. If it is a fact that Riggs has pointed out a peculiar condition of the alveolar edge which was not made known in any other way in writing, was he not entitled to the right of the discovery in the same sense as Bright is entitled to his discovery?

Dr. Bogue. If the premises were accepted as true, I do not know any reason why he should not be.

Dr. Mills. Dr. Garretson makes use of the term necrosed edge of the bone, and says it is necessary to remove it, and describes how it can be done with the engine-bur.

Dr. Bogue. I should not care to discuss the question.

Dr. Niles. I should like to say, as the etiology of these diatheses has been referred to, that considerable information is available in

the works of M. Rosenthal, on "Ataxia, Innutrition, and General Nervous Pathology;" also, in a little work of M. H. Anderson on "Phosphates in Nutrition." You all doubtless understand that the salts of calcium and magnesium predominate in the osseous and nervous systems; also, that circumstantial evidence strongly points to a class of nutrient nerves that preside over the nourishment of these systems (as well as others). Now, if there is paralysis of a certain portion of the body these nerves are more or less interfered with in performing their functions; thus, those salts in the circulation are not diminished, the supply goes on, and in the absence of the demand they must naturally accumulate or be thrown out of the circulation in some way, after a time. Another theory in regard to phosphatic diathesis was advanced some time ago by Dr. Prout, who claimed that it was due to the presence of an excess of phosphoric acid in the circulation, which acted as a solvent for these salts; but this has been proved not to be the case. Phosphoric acid is tri-basic and a powerful solvent of lime-salts. Repeated tests of the saliva and fluids of the mouth have revealed to me its presence in combination with salts, however. I noticed a report of some cases of locomotor ataxia, reprinted by the DENTAL COSMOS (January, 1881) from the New York *Medical Record*, which quotes from a French journal two cases where there was extreme looseness of the teeth with absorption of the alveolar border. The observers do not say that the local exciting cause was the accumulation of calculus, but this, doubtless, was the case. I know now of two cases of this kind in proof of this. In the case of the child referred to—affected with rachitis—there was a large deposit of calculus, doubtless caused by non-assimilation of bone-materials. The general conclusion in regard to the etiology of the many mild forms of this affection that come to us, is that something has directly or indirectly interfered with the normal functions of a certain set of nerves, or the whole system, to some extent. There may be a hereditary weakness in this direction, or it may be temporary, as in the commencement of a menstrual flow, or fatigue, etc., as I have mentioned. In answer to Dr. Bogue, I might further say, that tooth-powders composed largely of chalk are injurious, as by the free use of this carbonate, which is not soluble in water or the fluids of the mouth, the deposit may be increased. The same may be said of the strong alkalies incorporated into these compounds.

Dr. Mills speaks of the discoveries of Dr. Bright and Dr. Riggs (Bright's disease and Riggs's disease), and claims that Dr. Riggs is entitled to the discovery of a disease of the alveolus and gums, and should receive the same credit. Dr. Bright discovered a disease of the kidneys, and proved the grounds of his theory from a chemical,

pathological, and physiological stand-point, and the medical profession have been compelled to accept the theory. Dr. Riggs, as I understand it, has called our attention more particularly to a pathological condition of the mouth and prescribed treatment, for which he has invented instruments, in my opinion of great value to the profession. But in just the proportion that Dr. Riggs has informed the profession correctly upon the etiology and treatment of this affection, in that proportion will the future of the profession give him credit.

Dr. Atkinson. My first objection is to the nomenclature embodied in the notice of the reading of this paper before this body. The nomenclature is strained and effete. "Odontolithus" at best is an ugly word, which might much better have been expressed in English,—toothstone, or deposit of lime on the teeth.

The next is claiming it to be new as connected with excess of lime in the blood-crisis, which is simply a natural inference to any one who gives the subject attention, and not sufficiently a matter of demonstration to enter the text of a scientific disquisition upon the subject. And lastly, I object to the coupling together "calcic and phosphatic diathesis" by a copulative conjunction, for the reason that chemical combination occurs between acids and earths as base upon which the acids act to produce the salts which constitute that state of the fluids of the body known as diathesis.\* We will now examine the postulates of the paper in serial order:

1. "Inflammation and local conditions caused by calculus, and it not a product of disease." All I have to say respecting this first postulate is, it is gratuitous and not true.

2. "The product is derived from the saliva, as shown by its analysis, compared with the analysis of calculus and the location of the deposits." I do not regard this as satisfactory or demonstrated.

3. "The precipitation and hardening of the lime-salts is due to the alkalinity and viscosity of the saliva." This is vague and gratuitous.

4. "The conditions that favor the precipitation of phosphates and carbonates from the saliva are the same as those which favor their precipitation in urine, where the same salts are found, with the exception that the triple salts of phosphates of magnesia and ammonia are more frequently found in the latter." This needs elucidation to be acceptable or useful.

5. "The presence of an excess of these lime-salts is due to a superabundance of them in the circulation, or a calcic and phosphatic diathesis." This is a repetition of a statement presented as proof of its verity,—mere valueless verbiage, without point or purpose.

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\* Calcic or phosphatic would be acceptable, but calcic being basic, accords with magnesian, potassic, etc., and *not* with the agent acting upon these to produce mono-, bi-, or tri-basic salts.



6. "The secretion and excretion of this abundance of the salts is not an indication of health." This is equivalent to embryonic genuflexions of a foetus, the ultimate purpose of which is only apparent to those capable of going beyond the statement, which is simply a negation.

7. "Their presence in the circulatory system may be due to non-assimilation or changes in the osseous and nervous systems, or to direct or indirect abnormal conditions of the system." This is red-letter guessing with a vengeance, and could only arise from memorizing words without comprehending their significance and use.

In the paper it was stated, if my memory serves me right, that others had made examinations of the nodules softened, and the statement was that the softened nodules were pushed out into the mouth, and were cognizable and cognized as nodular masses of the lime-salts. How any one can make such a statement as that in the presence of men who are competent to comprehend the simple change that occurs in any solution is a marvel to me. If the solvent acts as a solvent it acts upon the point of the nodular mass with which it comes in contact, and that is not the portion that lies next to the cementum, but the exterior portion. Then what would the result be? It would be this: if that all came away, it would be utterly unrecognizable by the sharpest scrutiny as calculus nodules. I have seen teeth as clean as I could dissect them by reason of the redirect metamorphosis of the tissue composing the sockets and the gums. I wish I had a whole night, with a blackboard and prepared specimens, to show how utterly we have been in the dark as to the formation of the teeth, and how utterly at fault we are about comprehending the divineness and fitness of things. Who of you that has lived thirty years has not seen mercurial salivation—salivation from mercury—in mouths in which the teeth were standing in a magma of impure corpuscles—in a jelly-like mass, without sign of blood, as clear as albumen, made of the same material exactly?

I can show you plenty of alveolar processes from which the gums were entirely gone reproduced—new attachment and other tissue we call tissue of new production. All *that* I have said time and again, and it involves the same kind of principle that is present in this case. Dr. Mills said it was denutrition. He said debility. It is debility. It is want of normal molecular change, because the current that instituted that change was interrupted by either the vaso-motor or the sensory nerve-system.

Dr. Bogue. If it is retrograde metamorphosis that causes erosion of the gum and destruction of the alveolus, and loosening and falling of the teeth, how does the removal by the hand change the physiological or pathological condition of the patient, and what are the

next steps to be taken to reproduce this gum and these alveoli in a healthful, sound, hard condition?

Dr. Atkinson. As simple as falling off a log. You have to go beyond the cirroid line,—that is, the congested capillary line between this territory of retrograde metamorphosis in its unmistakable character and that as clearly healthy. In his remarks, Dr. Mills referred to the position relating to surgery by Dr. Riggs. All you have to do is to go beyond the point that is really dead, that has become foreign substance. In fact, there is no “dead” substance on this planet or any other! Take away the material that does not belong there and go through to a healthy territory to admit of the influx of pabulum, then secure a little pocket, and all is well. I can show you a number of cases of reproduced bone. This is the idea of diathesis in a nutshell.

Dr. Bogue. I want to know, if it please you, how, if retrograde metamorphosis is at the bottom of the difficulty which Dr. Atkinson has been describing,—how mechanically removing all that edge of bone, even including the soft parts, is going to so change the condition of the patient that there is not any further retrograde metamorphosis; that instead of pathological action we have physiological action set up; instead of death we have life not only, but a new growth, and the parts that have done their work and become necrosed are again grown out, and this time do not become necrosed?

Dr. Atkinson. I will repeat what I said, and appeal to every man who can make the point that twice one are two. It is this: take away that which is foreign to the location,—necrosed bone is foreign, fish-bone is foreign, a stick is foreign, many other things that I have been quizzed about are also foreign to the neighborhood,—and when retrograde metamorphosis has gone to the point of producing pus, sanies or ichor, we have these as examples of foreign and unwelcome presence. The point is this: every tissue starts from protoplasm, itself a form of tissue, and then goes up a divine ladder of construction, according to the type of the body that is to be built. And when it meets obstructions it goes down the ladder; it does not jump down at once in living bodies, it goes down by steps.

Dr. Bogue. The question was asked whether the salivary calculus was the cause of the loosening and falling out of the teeth?

Dr. Atkinson. It is impossible.

Dr. Niles. In regard to the nomenclature, to which the last speaker has referred, I will say that I have regarded it usually customary in giving the title to a paper, at least, to use technical terms. I have made use of the word “odontolithus” because it implies more than salivary calculus. Calculus or lime does not compose the whole of the deposits found. I have said in my paper that there are other

salts, viz., magnesia and triple salts. "Lithus" (a stone) embraces the whole of the deposit, but does not, as I understand it, signify its chemical composition; thus, the concretion found in the urinary tract is generally called "stone of the bladder," but, strictly speaking, it would be some form of calculus or those concretions which are not composed of lime, as urate of ammonia or soda, or a lithate, as the case might be. The detached nodules referred to by Dr. Atkinson are decalcified, as mentioned by the speaker, but as they have a matrix, their size and shape are retained after this is accomplished, and it is in this condition that they sometimes appear at the margin of the "pocket." In regard to "teeth falling out" where there is no deposit existing, this must be regarded as a statement without the history of the case in question. However, where five such doubtful cases appear to us there are ninety-five that have the deposit to that extent that leaves no doubt. A healthy periodontal membrane, we all know, has blood-vessels, nerves, and more or less connective tissues, which connect it with and enter the cementum of a tooth. Now, in the event of the death of the periodontal membrane, the tooth becomes detached from all soft tissue, as far up as the destruction extends, and there must be more or less of the remains of decomposed tissue left in the minute foramina which admits these tissues. Now, in this condition I think Professor Heitzmann, whom I know to be authority upon many subjects, will tell Dr. Atkinson that it is not probable that nature will ever clear or resurrect the contents of these holes, or introduce new tissues or establish circulation, and reproduce new gum and alveolus about such denuded dentures.

Dr. Atkinson. I want to speak directly to the point. Dr. Niles says, or implies, that some one has said that when there was a hole in the bone and a blood-vessel in it, you must resurrect that. Let the man that says that take the floor. There won't be a resuscitation, but a reproduction: from, first, protoplasm, then embryonal corpuscles, then bone-plates, and muscle-plates, and nerve-plates, in the order of the evolution of embryonal machinery. I state what I know. I said what I can prove. I state what I can show to any man if he has the desire to know what nature says, and not what some old foggy who has been shoulder-strapped into a high place says. Take a tadpole, cut the tail off half its length and leave it where nothing else in the aquarium can injure it, and you will get a reproduction of the tail in such a transparent condition as to enable you to see it put forth no fore-legs until that tail apparatus is completed, and when it is finished and has the necessary food, the feet are evolved, and he jumps forth free, minus gills and tail, a batrachian!

Adjourned.



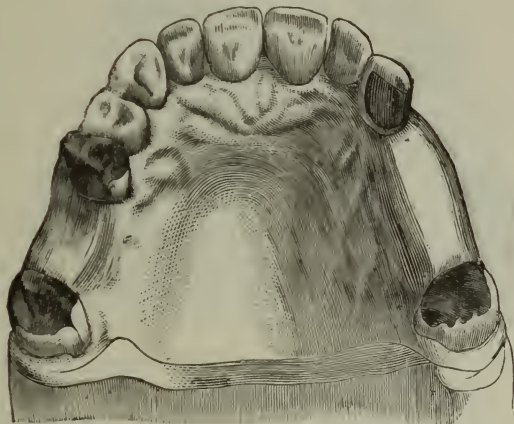
## ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

THE January meeting was held at the office of Dr. Essig, on the evening of January 8, 1881, Dr. Daniel Neall, president, in the chair.

The essayist of the evening, H. C. Register, M.D., D.D.S., read a paper, entitled "Grafting Artificial Crowns in Lieu of Plates," of which the following is an abstract:

Dr. Register said it was doubtless within the experience of many dentists to have listened to appeals from patients who had suffered, from accident, from caries, or from the incompetency or carelessness of a dental practitioner, the loss of one or more molars, bicuspid, or even the oral teeth, and who desired to have the resulting deformity corrected without the necessity of wearing a plate. Such persons, if males, are not only solicitous about appearances, but want especially something upon which they can depend to masticate without hesitancy and without fear of its dropping from its place. Lady patients, whose pride leads them to place a higher estimate on the

FIG. 1.

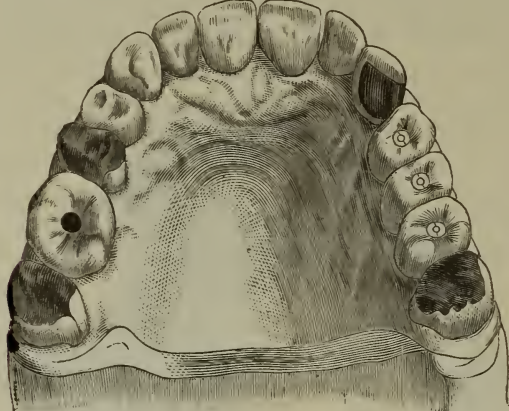


esthetics of replacement than on either comfort or utility, or both combined, generally learn to use a partial artificial denture on a plate more or less successfully; but the disability annoys less than does the presence of a foreign body in the mouth, and they soon, therefore, dispense with the incumbrance, wearing it only as a Sunday-dress, or on festive occasions.

Dr. Register proposed this evening to give the result of an experience, covering five or six years, of a method of supplying the needs of a majority of these cases. Let us consider a case such as is presented to you for examination. It is a typical example of

those which meet the eye of every practitioner almost daily. The first and second molars are absent, the third molar remains. The gap has somewhat closed, but it is still sufficiently large to render useless for mastication a fine inferior molar. The patient is a gentleman of culture and means, who never objects to prices, but who does strenuously object to wearing a plate. Some months ago Dr. Register performed for him this operation of grafting, converting this solitary molar into an abutment from which to span the chasm. The teeth in the inferior jaw, which, lacking occlusion, had already begun to elongate, now have the necessary pressure supplied by a durable fixture, enabling the patient to masticate his food thoroughly and with comfort. The essayist had termed this operation "grafting,"—using a license which is recognized as allowable in poetry, and which may as well be claimed by art. Grafting, according to Webster, means "to insert, as the shoot or cion of a tree is inserted

FIG. 2.



in another tree, as the stock which is to support it." Of course, the term in this connection is used only in the sense of support, and not of growth. It might be apprehended that a fixture of this nature would so interfere with the natural movements of the teeth as to produce inflammation or death of the pulp, but experience did not justify such a conclusion.

The doctor spoke of having seen, several years ago, two approximal cavities which had been filled with amalgam and bridged across. The operation struck him as being radically wrong in principle, but the gentleman said it gave him no trouble, and he decidedly objected to the making of a separation. It was this little incident which a short time after led Dr. Register to think that bridging these spaces with permanent fixtures was practicable, giving to

such patients a full arch without a plate. The operations are simple, because any practitioner of ordinary ingenuity can perform them; and yet they require the exercise of good judgment and mechanical skill. That they are practicable, the successful use of them by more than a score of the doctor's patients justified him in saying. In a period of six years but one crown has been broken off and one pulp destroyed by thermal influences. The essayist had expected to present to the society a patient upon whom he had performed his largest operation of this kind about a year ago, where seven grafted teeth do all the mastication; but he being out of town, was unable to be present, and inclosed the complimentary letter which the doctor begged to read. He had had numerous expressions of satisfaction from other patients, such as: "I would rather give a hundred dollars for this operation than ten for that abominable plate."

Dr. Register claimed that comfort and usefulness are as much to be considered as appearances, and that our practice should be eclectic. It is a great drawback to an operation that it should be so tedious as to utterly exhaust the nervous force of the patient. He therefore put the use of a good amalgam on the same footing with gold for the entire or partial attachment of these fixtures. In view of his own experience he claimed that the attachment of any number of teeth by this method was good practice. Isolated teeth, when the investing membrane is in good condition, are, in ninety-nine cases in a hundred, sure not to give after-trouble, provided all the conditions of success are carefully met. Dr. Register said that he did not wish to be understood as giving amalgam the preference in these operations. On the contrary, he would, so far as he alone was concerned, prefer gold.

There are two forms of fixtures which can be made, either of gold or platinum, or (which he much prefers) of iridized platinum. If amalgam is used, the latter metal is a necessity, because gold is unreliable when used in connection with amalgam.

Dr. Register then described what he designated as a very simple arrangement of plain plate teeth, backed in the ordinary way, originally used by Dr. Bing, for the attachment of a single tooth, and more recently demonstrated very beautifully by Dr. Webb. The backing can be allowed to extend over and cover the grinding surface. Dr. Webb cuts a groove around the approximal and cutting edges, and fills in with foil by the aid of the mallet, his object being to gain strength. The same result may be reached by the use of pure gold plate, which is easily burnished to place, minus the grooves. A flattened wire of sufficient strength is placed close to the gum, and allowed to extend into the facing teeth, in which cav-



ities have been made for its reception, the wire being bent at right angles with the shaft and the angles imbedded in the teeth. To this wire the artificial teeth, after being nicely articulated and the necks perfectly adapted to the contour of the gum, are soldered. If the pulp be dead, advantage should be taken of that fact, and the wire made to enter the canal as far as possible. When the pulps are living, the angle must be towards the cutting edge, extending back as far as practicable without risking an exposure of them. The form of the cavity should be as near a dovetail as possible, and with good strong walls. The portion of the wire within the cavity should be barbed, and so placed that a packing instrument can readily be made to reach around the entire circumference. The major part of this can be done upon the model, and when there is danger of over-fatiguing the patient, it is best to attach one end of the bar at a sitting, holding the other end temporarily with an oxychloride or oxyphosphate cement. When gold is used exclusively, it is best to complete the operation at one sitting, or at least to finish one filling and the cervical portion of the other, as otherwise subsequent manipulation becomes uncertain. The plan which Dr. Register now invariably adopts is to strike up a rim or saddle of iridized platinum, or very stiff gold, perfectly adapted to the alveolar ridge, and the teeth fitted to and allowed to extend over and imbed themselves



FIG. 3.

in the gum. (It is best to use zinc dies.) To this saddle attach the bars for entering the natural teeth. On this saddle solder in their proper places as many pivots as are required

for the teeth to be grafted. These pivots can be made of three-sided, threaded, or split wire for the attachment of a tooth somewhat similar to the Bonwill or Foster crown,—the difference being that the necks on the palatal and buccal surfaces are made much neater and long enough to reach up into the gum and bury themselves, forming a festoon which gives them a natural appearance. The hole in the crown is made square and dovetailed in two directions. The tooth is attached to the saddle with amalgam in the same manner as a Bonwill crown is attached to a natural root; or (which the doctor much prefers), where plastics are used in part, or where gold is used entirely, a square nut is made to run upon a threaded pivot and imbed itself in the artificial crown, and the interstices are filled in with gold, gutta-percha, oxyphosphate of zinc, or a small quantity of alloy. After the graft has been fitted as perfectly as possible upon the articulated model of the immediate parts, the crowns can be removed, and the saddle alone fitted into the cavities which have

been prepared, and fastened permanently into place, thus allowing all the room necessary for a perfect manipulation.

If amalgam has been used, either in the canals or in the cavity, a day or two should elapse before filling the body of the tooth with gold and attaching the crowns. When gold is used throughout, the operation may be performed at one sitting, provided the patient has the strength to endure it.

In case of accident to these teeth they are easily replaced, for the saddle forms a permanent base, and the pivot is always ready for the adaptation of a new crown. With the fixture first described an accident becomes a serious matter. The doctor has had, however, but one accident to occur, in which a crown broke off. He replaced it by one such as is shown. The pins are threaded, and are long enough to pass through the old backing. Small nuts, made to run upon them, fasten the tooth to place.

#### *Discussion.*

Dr. Webb said, that while he had never inserted two or more together in one space, he believed that as many as eight artificial crowns in place of the incisor and bicuspid teeth could be permanently attached to the cuspids and first molars, provided these teeth are firm in their sockets. He would deem it best, in the performance of such an extensive and difficult operation, to have the pulp-chamber in each cuspid tooth in which to anchor the heavy gold wire (about No. 10, 18-karat) to insure permanency. The wire could be well anchored in the molars without endangering the pulp. The speaker stated that while the destruction of pulps ought to be the last resort, yet since the pressure of a plate favors absorption of the tissue beneath or near it, thus bringing about loosening of the remaining teeth, and sometimes leading to their loss years before this need occur, and also, since the patient in whose mouth such an operation might be called for, would very likely be of the age when calcification of the tissues is usually complete, then the loss or destruction of the pulp (if the tissue be removed before it is disintegrated) is not so serious a matter as under other circumstances. Indeed, for the maintenance of the normal condition of the remaining teeth, the gums, and alveolar process, the end (if well-attained) would justify the means. Each porcelain crown ought to be soldered to the heavy gold wire extending from tooth to tooth. A groove should be made in both sides of each porcelain crown, into which gold is built and extended over the palatal portion, restoring the contour,—cusps should also be built up where necessary,—and thus holding the crown more securely in place. The gold, which should be cohesive, must be made compact as it is put into place, which can

be done with the electro-magnetic mallet better than by any other known method. The speaker would have eight such crowns built in place with gold rather than wear a plate, but the whole operation would have to be well-performed by a fine operator or not be done at all. He has now in preparation two crowns—a central and lateral incisor—to be attached to the root of the central incisor and built into the cuspid on the same side of the mouth; the root of the lateral having been lost from fracture. [These crowns, as prepared for the building-on of gold foil, were shown to the members present and the case was fully explained.\*] He has built-in fourteen crowns in as many cases, and the gums under and about them are in good condition. The operations were so performed that no food can get between the crown and gum. The first of these fourteen crowns was inserted February 12, 1873, and it is now as firm as ever, and those built-in since that time are doing well, though the speaker has re-performed two of the operations, for the reasons that in one case a part of the cutting-edge of the enamel of a lateral incisor, to which one end of the wire was attached, was broken away and the gold was moved a little from its anchorage, owing to improper occlusion of the teeth during a prolonged absence of the patient. The other crown replaced was that of an upper bicuspid, where the patient, by biting a hard chestnut, broke away the porcelain face, leaving the gold attached as firmly to the two adjoining teeth as when built in place about a year before. In re-performing this, as well as the other operation, there was not as much preparation needed, nor was there the pain incident to preparing the cavities as at first, and the gold foil was not only built into the grooves and made compact throughout, but the cusp or cutting-edge of the porcelain portion of the crown was covered with solid gold, and hence was supported and protected from the occlusion of the lower teeth. The foil was so built on and finished before the crown was inserted that the narrow line of gold can scarcely be seen, and it is therefore not conspicuous. In each of these cases the porcelain was so securely fixed in position that it cannot break away. Each patient submitted without complaint to the performance of the operation, and the operator (the speaker) has decided that never again will he build-in another crown without protecting, if not entirely covering, the cutting-edge of each porcelain face, thus insuring still greater permanency of such operations.

Dr. Darby had seen many of these operations of Dr. Webb's, and could testify to their having been skillfully performed. He differed

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\* This case will be fully described and illustrated in a future number of the DENTAL COSMOS.



from Dr. Webb in regard to packing foil in grooves in artificial teeth, thus, as he thought, materially weakening them, and spoke of the difficulty of repairing these cases in case of accidental breakage, and mentioned how he had easily mended one of his that had broken, by getting another tooth of the same mould and same shade, drilling through the backing where the pins were to come, and then, after countersinking well, riveting the new tooth in place by means of a plate-pin punch.

Dr. Essig spoke of a case of seven artificial teeth mounted on a wire and inserted into teeth and roots with gutta-percha and amalgam, done by a foreign dentist. It came into his hands on account of its failure; had only been worn two years, but had been very imperfectly done. He believed in inserting one or two teeth in this way, but did not think it practicable to set more in one space. He spoke in commendation of the operations of this character as performed by Dr. Webb. He considered a neatly-made and well-fitted gold plate much the best where several teeth had to be inserted.

Dr. Bonwill said one of the principal objections to teeth inserted on the Bing plan was the difficulty of repair in case of fracture or accident. He believed rather in attaching crowns to roots in such a way that in case of accident a new one could be placed, and spoke of his well-known method of inserting a barbed wire in the root, leaving the wire long enough to pass through the crown, and then attaching the crown over the wire by means of amalgam. If he mounted on a small metallic base, he would use a combination of platinum and iridium, on account of the greater strength obtained. He also spoke of the adaptation of his crowns (all porcelain) for such operations as those shown by Dr. Register, *vide* his article on "Pivoting" in the August number of DENTAL COSMOS for 1880, and referred to the necessity for such teeth, whereby replacement could be made on the plate, if necessary, without disturbing the work of anchorage. He also said that where cases required it, bolts, with threads cut thereon, could be anchored in sound or any adjacent teeth, and the crown or crowns placed on with a nut, so that the whole thing could be removed for repairs to plates, artificial teeth, or natural teeth.

Dr. Webb explained more fully some of the details of his general practice of attaching crowns. He further stated that, while Dr. Bing is said to have been the first to insert artificial crowns where a root was missing without a plate or clasp, yet others have made modifications and some improvements in this manner of inserting crowns. Dr. Bing simply backed a porcelain crown with 18-karat gold plate, and to this soldered a gold wire, each end of which he

built with gold into a cavity made or prepared in the palatal portion of the enamel of each of the two teeth adjoining; the wire being thus exposed and liable to retain pieces of food about the parts. It was stated that he also extended a point of gold plate or wire into a cavity in the approximal surface. The speaker not only claims the building of gold foil into a groove made partially or entirely around the sides of the porcelain, and restoring the contour of the palatal portion of the crown, thus dovetailing this porcelain in place and making it more secure, and the crown more cleanly, as original with himself, but the building of such a crown into the approximal instead of the palatal surfaces of each of the two adjoining teeth, and having nothing but pure gold exposed, is a different operation. When such operations are well performed they are not only more secure, but present a finer appearance than those done according to Dr. Bing's method.

Dr. Bonwill thought the objection to Dr. Webb's method was the weakening of his artificial crown by packing gold about it, and then the great labor and loss in removal, when made necessary by accident.

Dr. Darby said that the packing of gold in a groove cut in an artificial crown certainly weakened it, and he therefore must object to this portion of Dr. Webb's plan.

Dr. Bonwill wondered how Dr. Webb was sure, after soldering his artificial crowns to wire, that he had not cracked them.

Dr. Webb said there might not be absolute certainty about it, but he took great care in his heating.

Dr. Bonwill said Dr. Webb's plan was essentially the same as that of Dr. Bing, and, all things considered,—time, expense, labor, ease of repair, etc.,—he preferred the Bing method.

Dr. Webb said that for the reasons already given, his method of attaching crowns is not essentially the same as Dr. Bing's, whose plan, while requiring less skill, time, and labor, does not make so fine and permanent an operation as when a crown is prepared and built in place, as practiced and advocated by the speaker. The preparation of the porcelain, so that the gold can be nicely and solidly built into a groove along each side, and carried so far over the cutting-edge as to bind in and protect the crown, strengthens rather than weakens it when the work is properly done or the operation completed. A porcelain crown is made far more secure and the parts more cleanly in this way than by simply backing with gold plate and depending only on the platinum pins for support. The preparation of the crown and building of gold foil is done out of the mouth at whatever time may best suit the operator, but the work requires care and must be skillfully done. If the whole operation of attach-

ing a crown be well performed, the necessity for repair will so rarely occur that provision need scarcely be made for it; but if it be best to do this, the crown devised by Dr. I. F. Wardwell, of New York, is the proper one to insert. His plan consists in so arranging and soldering a thick, rather narrow gold plate to the platinum pins in the porcelain crown and beveling the sides of the plate towards it as to have this plate slide tightly into another gold plate, shaped to receive it. This second gold plate is soldered to the gold wire, which is built into cavities in the adjoining teeth with gold foil, and by inclosing the beveled sides of the plate on the porcelain, "dove-tails" or holds the crown in position. The crown is then pressed into place and made secure by filling-in gold foil near the cutting edge of the tooth, after the wire with the plate soldered to it is built in place. Should the porcelain break in such a case, another crown can be substituted without removing the wire.

Dr. Essig spoke of the greater strength of platinum and iridium than of platinum alone.

Dr. Tees. Platinum, with pure gold as a solder, is the proper metal to use for these appliances, and Bonwill's crowns are the proper teeth, provided there is not too close an articulation with the lower teeth. In case of fracture, a new tooth can be supplied without removing the fixture. I do not agree with Dr. Bonwill that amalgam should be used instead of gold in the case presented by Dr. Webb. Amalgam should never be used in the anterior teeth when the pulp has been devitalized.

Dr. Daniel Neall spoke of the different methods of mounting artificial crowns without plates, as described by Drs. Register, Webb, and Bonwill. He thought the objections to the plan proposed by Dr. Register were the probability of food collecting beneath the narrow band to which the crowns were attached, and the possibility of this band bending under the pressure of mastication, especially where the band was long and supported several crowns. In reference to the plan of building-in crowns with gold, he could not believe, for his part, that any operation that took three or four hours to perform, as in the cases done by Dr. Webb, and which then was so liable to accident, upon which the whole appliance would have to be removed and done over at great labor and expense, was the proper one to perform. He did not believe that the results warranted so great an expenditure of time, labor, money, and vital force, on the part of both patient and operator, while there remained other processes simpler and not exposed to this objection.

Dr. Tees. It is almost impossible to crack a tooth in soldering, ordinary care being taken in heating up the set, if asbestos is used instead of sand,—two parts of plaster and one of asbestos. There



are three varieties of asbestos in the market,—a hard, shredded kind, somewhat resembling talc; a soft, feathery kind; and a brown, pulverized. The second variety is used in continuous-gum work; the last is the proper kind for gold and silver work.

### PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY THEODORE F. CHUPEIN, D.D.S.

At a meeting of the Pennsylvania Association of Dental Surgeons, held December 14, 1880, Dr. W. H. Trueman read a paper, entitled "Amalgam; its Defects and the Progress made in Improving it," which the essayist accompanied with manipulations, showing what he thought was the best manner of incorporating the alloy with mercury. At the conclusion of the reading there ensued the following discussion:

Dr. Daniel Neall said that at one time the current of opinion was such that it was as much as one's reputation was worth to use amalgam; it was regarded as a "cheap" material; but we all know that the cost of filling material is of little moment in comparison with the service rendered. A great point was gained in the use of amalgam by the saving of vital energy to both operator and patient. Another point in its favor is that, on account of the saving of time, we are able to fill the teeth of the poor as well as those of the rich. He would not use amalgam in the front teeth, but thought it might be used in at least 20 per cent. of the cases that come to us for treatment, in cavities not exposed to view. While he used it freely he did not advocate its employment indiscriminately. He thought that young teeth, or teeth poorly calcified, could be better filled with amalgam than with gold, provided the work was well done; but failure occurred with it as with gold; for what work of man does not fail at times?

Dr. Peirce said that discoloration was observable in gold fillings as well as amalgam, but not to so great an extent. There was a certain bluish cast to be seen in many filled teeth, which he thought was due to the condition of the teeth and the fluids circulating in them. He thought that the discoloration of the old silver amalgam was largely due to the affinity silver had for sulphur; hence the black which was noticeable was simply sulphuret of silver. He presumed that this was recognized by Dr. Townsend, and probably for this reason he added five parts of tin to four parts of silver, which is the formula of his amalgam. An amalgam of twelve parts of silver and ten parts of tin sets quickly, and keeps bright. An amalgam of twelve parts silver, ten parts tin, one part gold, and one part zinc, will set in fifteen minutes hard enough to burnish, and will keep

bright. He preferred not to have an excess of mercury in the amalgamated mass. He thought that one could not squeeze out mercury from amalgam made of several metals without interfering with the relative proportions of the alloy. Thought it better to add alloy rather than squeeze out an excess of mercury. He finds no advantage gained, either in strength or durability, by using platinum in the formula of an alloy. We should recognize in the use of materials what is best to save teeth. He believes tin has a therapeutic influence on the teeth. In teeth where decay was progressing rapidly he believed tin was especially applicable. Also in cavities below the margin of the gum, where it was impossible to keep the filling dry, tin could be easily placed, with the addition of gold above, without the least fear of galvanic action between the two metals. In answer to Dr. Bonwill he stated that he used much more amalgam in his practice than formerly.

Dr. Bonwill gleaned two points from the essay worthy of serious consideration. First, that since the introduction of Townsend's amalgam twenty-five years ago, no true advance had been made in the combination of alloys for filling teeth, and the essayist seemed satisfied that none was needed; second, that the better results from amalgam fillings, in the last decade, were solely attributable to the working of a smaller quantity of mercury into the alloy, without washing, and by compressing afterwards, making it a thicker paste. While I admit that very much is due to the mixing and manipulating, and to the better preparation of cavities, yet we must consider that the manufacture of alloys is now done by those who are skilled in metallurgy, that the purest materials are used, and that mercury of higher distillation and purer quality is used by the dentist. I am not ashamed to state that I am even using an alloy of my own manufacture in some cavities in the front teeth. I will add that aside from having better materials and more skillful manipulators, fillings are comparatively valueless unless they are so contoured on their approximal walls that no tooth-substance is left in contact with either tooth-structure or with metal to form capillary tubes to draw decomposing substances to points where there is tooth-structure to act upon. I mean contour where there is no remaining tooth-structure worth retaining. In very small cavities, where anticipation is attempted, there is no necessity for contour, as the solid structure on the buccal or palatal wall, perfectly shaped, will completely save from further decay, and that without destroying so much of solid bone to gain access for a gold filling. I therefore place myself on record as being a friend to amalgam, but only until it can be superseded by something better. My desire is to obviate any necessity for the use of filling materials.

Dr. Buckingham said we should endeavor to arrive at some conclusion in this matter. Much had been said of the compatibility of filling materials with the teeth. We should endeavor to find out whether a tooth tolerated one filling material better than another. Can any better filling than gold be put into a tooth? Dr. Peirce said that he used tin in certain localities, particularly at the cervical walls, and he thought that tin had a therapeutical effect. The question is not as to the cost or value of the material used, but what is best for the preservation of the teeth. He thought the active agent of decay was oxygen. Tin, though inserted under moisture in a cavity in a tooth, and though inserted in an imperfect manner, was known to preserve the tooth better than any other substance inserted in a similar condition. This, he thought, was due to the formation of an oxide of tin, which was inert. A dentist of any standing never looked at the cost of the material he used, but at the time occupied in the performance of the operation. Amalgam had been made of all gold, but he doubted if any advantage was thus gained. He did not think that all gold would make as good an amalgam as all silver. Copper will not amalgamate easily with mercury, yet some claimed that copper in amalgam was beneficial. Copper in amalgam will stain a tooth a greenish or a blackish color. One-tenth copper added to silver in an alloy will add to its hardness. An alloy of silver four parts, and tin five parts, files soft. Platinum does not amalgamate well with mercury, and he did not think it improved an alloy. He thinks that mercury acts like a solder to the metals employed in the composition of alloys, uniting these together cold, as solder does with heat; that frequently much of the filings does not entirely unite with the mercury, and to this failures might be sometimes attributed. Dr. Wildman, when with Dr. Birkey, many years ago, filed up silver and mixed it with tin foil to make amalgam, thereby forming a mechanical union of the metals. Dr. Townsend's formula was, silver, four parts; tin, five parts. The question now is whether we are satisfied that the behavior of amalgams justifies their use. It had taken twenty years to overcome a deep-seated prejudice against the use of amalgam. He spoke of the edge-strength claimed for amalgam, and designated by diagram how this edge-strength failed, either by breaking away itself, or by the enamel breaking away and leaving it protruding from the cavity.

Dr. James Truman thought a great deal was due to the preparation of the material, as well as of the cavity, to avoid the breaking away of the edges. He had no opinion to offer as to the quality of the different alloys, yet he thought none better than the Townsend formula. He thought, with Dr. Peirce, that tin exerted a beneficial



effect on the dentine, and fillings of tin and gold foil could be advantageously used, especially at the cervical margins. It was useless to expect that oxychloride of zinc would remain intact at the cervical edge. Owing to the almost universal acidity there, it would disintegrate, wash, or entirely fail, while tin or gutta-percha in the same locality would stand. An intelligent appreciation of these facts should be inculcated, that more beneficial results may be secured by the combination of materials. He did not think any amalgam filling should be finished at one sitting; the filling should be inserted at one and finished at another, when entirely hard; and that the same care should be used in this part of the operation as with a gold filling. In this way the edges—which so often fail or break away—may be made perfect. Teeth differ in different individuals, and even in the same mouth, and the greatest care required in any filling of any material was at the cervical wall. It must not be supposed by the young or vigorous that this inclination to use amalgam was due to age or lack of vital energy. He felt able to do with gold now whatsoever he had done in the past; but an extended experience compelled him to admit the value of amalgam and other plastic fillings.

Dr. W. H. Trueman thought that manipulation of amalgam had very much to do with the result. He thought the best results were obtained where the quantity of mercury was just sufficient, and recommended weighing the mercury and alloy to insure this result. With amalgam made from Townsend's formula, from four to six grains of mercury to ten grains of alloy seemed to give the best results. When mixed by the method recommended by Mr. Fletcher, in these proportions, this amalgam is easily worked, packs well, and shows but a very slight excess of mercury on the surface. If an excess of mercury is used in mixing, and the attempt made to remove the excess by pressure between the jaws of a vise, it is difficult to reduce the quantity of mercury to less than six or seven parts to ten of alloy, and the amalgam is left in a hard, compact mass, very difficult to work, even in favorable cases. When mixed in this way, to work with the same ease as when mixed by Fletcher's method, it required nearly twice the quantity of mercury. The difference in the proportion of mercury required by the two methods of mixing will hold good with any alloy. He had no doubt that the shrinkage so often complained of was due to the excess of mercury, —an excess almost impossible to avoid by the methods of preparing it generally in use. He also thought that thorough trituration of the mercury and alloy in a mortar—sparing neither muscle nor time—is a matter of more importance than it is usually considered. The introduction of gold, platinum, and other new alloys being also

accompanied by the introduction of better methods of using and preparing amalgams, occurring at a time when the old prejudice was dying out and the value of the material, when judiciously used, was beginning to be appreciated, makes it very difficult at this time to estimate how much of the increased success and satisfaction in its use is due to the new alloys, and how much is due to the better treatment of the material itself. He had been using Townsend's amalgam for over fifteen years, making it from the same formula, and in the same way. During that time he had used nearly all the different kinds that have from time to time been brought to our notice, side by side with it, and had carefully noted their behavior, and was free to say that, while many had done as well, none had done any better than the old stand-by of four parts pure silver to five parts of tin. So great was the improvement brought about by the changes in manipulating it that it was sometimes difficult to realize that it was really the same material. Still it had faults; these he hoped future advances may either reduce or remove.

Adjourned.

#### FIRST DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

At the thirteenth annual meeting of this society, held at the residence of Dr. A. C. Hawes, New York City, on Tuesday evening, April 5, 1881, the following-named gentlemen were elected officers for the ensuing year:

*President.*—Dr. William H. Atkinson.

*Vice-President.*—Dr. William T. La Roche.

*Secretary.*—Dr. G. W. Weld.

*Treasurer.*—Dr. Charles Miller.

*Censors.*—Drs. A. L. Northrop, W. A. Bronson, E. A. Bogue, Frank Abbott, C. A. Woodward. G. W. WELD, *Secretary*.

#### ALUMNI ASSOCIATION OF THE BOSTON DENTAL COLLEGE.

The tenth annual meeting of the Alumni Association of the Boston Dental College was held at the college building, No. 485 Tremont Street, Boston, Mass., Wednesday, March 2, 1881.

The following were elected officers for the ensuing year:

*President.*—Dr. R. R. Andrews, Cambridge, Mass.

*First Vice-President.*—Dr. Leon Rideout, Lynn, Mass.

*Second Vice-President.*—Dr. R. L. Robbins, Boston, Mass.

*Secretary.*—Dr. Edgar O. Kinsman, Cambridge, Mass.

*Treasurer.*—Dr. George C. Ainsworth, Boston, Mass.

*Executive Committee.*—Drs. William P. Leavitt, L. C. Bryan, and H. A. Baker, Boston, Mass. EDGAR O. KINSMAN, *Secretary*.

## THE SOCIETY OF THE ALUMNI OF THE DENTAL DEPARTMENT OF THE UNIVERSITY OF PENNSYLVANIA.

UNDER the above title the graduates of the Dental Department of the University of Pennsylvania formed themselves into an alumni association at a meeting held in Medical Hall, March 1, 1881, and the following officers were elected:

*President.*—Dr. Charles T. Howard.

*First Vice-President.*—Dr. Victor M. Smith.

*Second Vice-President.*—Dr. Charles C. Southwell.

*Third Vice-President.*—Dr. H. Louis Reinecke.

*Corresponding Secretary.*—Dr. W. A. Johnson, Peoria, Ill.

*Recording Secretary and Treasurer.*—Dr. S. R. Wing.

*Orator.*—Dr. W. H. Barclay.

*Executive Committee.*—Dr. H. Gauger, Dr. E. P. Hawes, Dr. J. E. Harlan, Dr. G. H. Worrall, Dr. H. C. McClure.

The next meeting of the society will be held upon the annual commencement-day in next March.

Graduates who wish to join the society can do so by sending their names to the corresponding secretary and inclosing the yearly dues (one dollar).

W. A. JOHNSON, *Corresponding Secretary.*

## UNIVERSITY OF MICHIGAN—DENTAL DEPARTMENT.

THE Sixth annual commencement of the Dental College of the University of Michigan was held in the hall of the university, Ann Arbor, Mich., on Wednesday, March 23, at 2 P.M.

The annual address was delivered by Dr. F. H. Rehwinkel, of Chillicothe, Ohio.

The degree of D.D.S. was conferred upon the following-named persons by the president of the university, Dr. Henry S. Frieze:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
Wilbert George Bean.....	Michigan.	Stephen H. Gerow.....	New Brunswick.
Henry F. Billmeyer.....	Michigan.	William Milo Hunt.....	Ohio.
Albert Victor Bills.....	California.	Augustus N. Johnson.....	Michigan.
Ephraim David Brower.....	Iowa.	Edward L. Kellogg.....	Kansas.
Joseph Burger.....	Bavaria.	Jennie C. Kollock.....	Illinois.
Solon Orville Burrington.....	Wisconsin.	John James Little.....	Pennsylvania.
Charles Robert Calkins.....	New York.	Charles Maclean.....	Michigan.
George Henry Corey.....	Ohio.	Guy Hamilton Morgan.....	Pennsylvania.
Henry C. Corns.....	Michigan.	Denton E. Peterson.....	New York.
Lewis Craine.....	Pennsylvania.	Charles Jay Siddall.....	Ohio.
Hiram De Puy.....	Pennsylvania.	Charles Alfred B. Sipe.....	Ohio.
Alban Vaughan Elliott.....	Dist. of Col.	John Silvus Tucker.....	Illinois.
Almos Elias Emminger.....	Ohio.	Joseph Wm. Wassall.....	Wisconsin.
Fred. N. Emrick.....	Ohio.	Howard L. West.....	Vermont.
Orion Jonathan Fay.....	Michigan.	B. Clark Williams.....	Ohio.



## VERMONT STATE DENTAL SOCIETY.

THE fifth annual meeting of the Vermont State Dental Society was held in Burlington, March 16 and 17, 1881.

The following were elected officers for the ensuing year:

*President.*—Dr. L. T. Lawton, Rutland.

*First Vice-President.*—Dr. S. D. Hodge, Burlington.

*Second Vice-President.*—Dr. E. E. McGovern, Vergennes.

*Third Vice-President.*—Dr. W. H. Kingsley, Middlebury.

*Secretary.*—Dr. C. F. Lewis, Burlington.

*Treasurer.*—Dr. James Lewis, Burlington.

*Executive Committee.*—Drs. Wellington, Chase, and Clark.

Resolutions of respect and condolence with reference to the death of Dr. C. R. Pell, of Montpelier, were unanimously adopted.

The next meeting will be held at Burlington, the third Wednesday of March, 1882.

CHAS. F. LEWIS, *Secretary*.

## ILLINOIS STATE DENTAL SOCIETY.

THE seventeenth annual meeting of the Illinois State Dental Society will be held at Rock Island, commencing Tuesday, May 10, 1881, and continuing four days.

Practitioners in other States are most cordially invited to be present.

EDMUND NOYES, *Secretary*.

## IOWA STATE DENTAL SOCIETY.

THE nineteenth annual meeting of the Iowa State Dental Society will be held at the Kimball House reading-rooms, Davenport, commencing Monday evening, May 9, 1881, at eight o'clock, and continuing four days.

The subjects of dental legislation and the establishing of a dental department to the Iowa State University will receive especial attention at this meeting.

Members of the profession are cordially invited to attend.

E. E. HUGHES, *Recording Secretary*.

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 OBITUARY.

## DR. JOAQUIN SILVA.

DIED, at Utille, Honduras, Central America, November 1, 1880, after a short illness, Dr. Joaquin Silva, aged forty-five years.

Dr. Silva was a native of Puerto Principe, Cuba. He was a graduate of the Pennsylvania College of Dental Surgery, class of 1872-73; and during his practice made a reputation for being a good operator. He was of a kindly disposition, and a genial gentleman.

## BIBLIOGRAPHICAL.

A SYSTEM OF ORAL SURGERY: Being a Treatise on the Diseases and Surgery of the Mouth, Jaws, and Associate Parts. By JAMES E. GARRETSON, M.D., D.D.S. Illustrated with numerous Steel Plates and Wood-cuts. Third edition, thoroughly revised, with Additions. Philadelphia: J. B. Lippincott & Co., 1881.

We have been kindly furnished by the publishers with advance sheets of this volume, and are thus enabled to write of it coincidentally with the announcement of its issue.

The present is entitled the third edition of this work, but it is much more than is usually signified by a new edition. It is rather a new book than a new edition. A condensed-face type has been used, increasing the capacity of each page, and permitting the introduction of much new material and about two hundred additional illustrations. A large proportion of the matter has been rewritten, and the author now gives the volume to the profession with the conviction that he has embodied therein the best results of his life-work. He has certainly succeeded in producing a book well worthy of commendation because of its condensation, if for no other reason.

On the theory that a text-book should advance from the mechanical to the scientific, from the simple to the complicated, the author treats first of dental art, and then of special surgery. The first part of the book discusses operations on the teeth from the mechanical stand-point; the second part, conditions requiring medical and surgical treatment. In the former, dental caries is simply a hole in a block of ivory; in the latter, the hole is considered as a pathological problem.

In order that those interested may form some idea of the character and scope of the work, we note that eight chapters are devoted to operative dentistry, in which the author includes that only which may be designated as the art treatment,—mechanical manipulation. Two chapters, under the title of "Prosthetic Dentistry," treat of the preparation of the mouth, taking impressions, models, articulation, esthetics, palatine defects and their mechanical correction. Succeeding chapters discuss the surgical anatomy of the mouth and face, the oral cavity and its relations, the fifth pair of nerves, surgical anatomy of the teeth, dentition, associative lesions of first dentition, anomalies of second dentition, diseases of the teeth, dental caries, therapeusis, the oral fluids, odontalgia, periodontitis, alveolar abscess, the pulp-chamber and canals, discolored teeth, replantation and transplantation, salivary calculus, denudation, the gums and

their diseases, the aphthæ, wounds of the mouth and associate parts, the tonsil glands, the tongue and its diseases, diseases of the floor of the mouth and of the pharynx, palatine defects and their treatment by operation, diseases of the nose and face, lupus and epithelioma, operations upon the lips and cheek, vascular system of the facial region, the antrum of Highmore and its diseases, salivary fistulæ, caries of the maxillæ, necrosis, dislocations and fractures, exsection of the maxillary bones, ankylosis, neuralgia, and nerve-lesions and their treatment. Five chapters are given to the classification and treatment of tumors. The closing chapter is devoted to anesthesia.

Under these various headings are presented the histology, anatomy, physiology, and pathology of the mouth, jaws, teeth, and associated parts, and the mechanical, therapeutic, and surgical treatment of the numerous lesions to which they are liable. That, in a book aiming to convey so much and such varied instruction, the author may have failed to satisfy all expectations, is more than likely. A certain amount of elementary knowledge, of manual dexterity, and of common sense in the student or practitioner is assumed; but noticeable throughout the volume is the evident care which has been taken to teach *principles*,—every subject discussed being treated with special reference to that end. As exhibiting the relationship existing between general medicine and dentistry, the fact is recognized that what is not purely mechanical in dentistry is really medical or surgical, and therefore requires a knowledge of the general principles of medicine and surgery; that no man can practice dentistry, except as an art, unless he has an appreciation of these general principles,—principles which underlie equally all practice, whether on a tooth, an ear, an eye, or on the animal economy as a whole.

This work of Dr. Garretson's fills an otherwise unoccupied space in the literature of dentistry and medicine, and commends itself therefore alike to dentists, physicians, and surgeons. It is the production of such books—exhaustive as near as may be of a limited field of research—which is at once the explanation and justification of specialism.

One who is ambitious to develop in any particular direction an accuracy of diagnosis or therapeutic or surgical skill above his fellows must have a keener perception than they of the histology and physiology of the parts, and of the morbid changes induced by disturbance of their physiological processes. And not less necessary is it that he should comprehend the relations of systemic conditions to local lesions, or, reversing the statement, of local lesions to systemic conditions.



We contended before the appearance of the first edition of this book that a link was needed to unite dentistry with medicine and surgery; that there was a deficiency on either side, and that urgent reasons existed why the deficiency should be supplied. We still insist more strongly than ever before that those who fail to see the evolution in progress, and are content to rest on their mechanical skill alone, will be left behind. The demand for a higher professional standard in dentistry is constantly increasing, and it can be met only by a more thorough preparation on the part of its practitioners.

For these reasons we commend Dr. Garretson's book, and urge its study upon all who have failed to make themselves familiar with the medical and surgical relations of dental practice, as well as upon medical practitioners who have not hitherto made themselves acquainted with the variety and importance of dental lesions and their relations to general practice.

THE PRINCIPLES AND PRACTICE OF SURGERY: Being a Treatise on Surgical Diseases and Injuries. By D. HAYES AGNEW, M.D., LL.D., Professor of Surgery in the Medical Department of the University of Pennsylvania. Profusely illustrated. Vol. II. Royal octavo, pp. 1066. Philadelphia: J. B. Lippincott & Co., 1881.

The second volume of this magnificent work is in all respects entitled to the commendations so freely accorded to its predecessor. The long experience, the untiring assiduity, and the universally-recognized skill of its distinguished author were of course a sufficient guarantee of the manner in which his work would be performed. The volume itself furnishes not alone the proof of practical acquaintance with the subjects discussed, but also of careful observation, of diligent research, of mature thought, and of earnest effort to furnish a practical and reliable guide to his readers. It would be impossible to do justice to this volume of nearly eleven hundred pages in a necessarily limited notice; but, in brief, to our mind the descriptions of pathological conditions, the objects of surgical interference, and the methods of procedure are so clearly and forcibly presented as to leave little justification for error of diagnosis or treatment. A general and comprehensive view is taken of the subject in hand; the various forms and modifications of the disease or injury are described; the theories and treatment of others are concisely given, and, finally, the conclusions and practice of the author are set forth, with reasons clearly and tersely stated for difference of opinion and practice, if such exists. The practical character of the instruction—the thoroughness of the teaching—is a notable feature of the book. .

The author has evidently labored conscientiously to give to others the best and most reliable results of his busy and painstaking practice. In the monographs of specialists there may be more definite information upon certain points, but, Dr. Agnew's work, when completed, will be an encyclopedia of the science and art of surgery, the possession of which will be an absolute necessity to every practitioner of surgery, and to every medical practitioner who appreciates the relations of medical and surgical science.

The closing chapter gives one hundred and forty pages to the "Surgical Diseases of the Mouth," and treats of deformities, wounds, and diseases of the lips; diseases and injuries of the tongue; diseases of the gums; affections of the teeth; extraction of the teeth; diseases and injuries of the jaws; affections of the antrum; cleft palate; affections of the hard and soft palates; diseases of the salivary glands, and of the pharynx and œsophagus. The treatment of these topics is necessarily condensed, but discriminating and sound. We hope this chapter will be carefully studied by medical practitioners, who are usually so lamentably deficient in even an elementary knowledge of the pathology and therapeutics of dental complications.

This volume alone contains nearly eight hundred illustrations. The book is exceptionally well and fully indexed, and the paper and typography are all that could be wished.

ZAHNÄRZTLICHER ALMANACH, 1881. Ein Alphabetisch Geordnetes Namensverzeichniss der im Deutschen Reiche und in Oesterreich-Ungarn practicirenden Zahnärzte. By ADOLF PETERMANN, D.D.S., Frankfurt-am-Main. In Commission bei Johannes Alt, 1881.

We have received a copy of the above little German work for 1881. It seems to have created a demand for its annual appearance, this being its fifth year of continuous publication. It contains, as heretofore, an alphabetical list of practicing dentists in Germany and Austro-Hungary; statistics of their distribution as compared with the distribution of population, and the territory their practice covers; obituary in the profession during the preceding year; information as to the laws of the German kingdom in relation to the subject of dentistry, with the penalties for illegal practice; a computation of those holding professorships and degrees; an exposition of the frauds of John Buchanan in the bogus diploma traffic; a list of dental publications in Europe and America, with a list of prominent manufacturers of and dealers in dental goods throughout the world. Two steel portraits are given of prominent dentists. The little book fills a niche previously unoccupied.

WHAT EVERY MOTHER SHOULD KNOW. By EDWARD ELLIS, M.D. Philadelphia: Presley Blakiston, 1881.

This little volume owes its origin to the favorable reception accorded a previous work of the author, entitled "A Practical Manual of the Diseases of Children." So much of the substance of the larger volume, omitting technicalities, as seemed adapted to the wants of mothers is presented in this book. It contains general directions on nursing, hygiene, and other matters needful in the management of the nursery; information with reference to the different foods and general diet for children in health and disease; such an account of symptoms as should enable parents to form an opinion whether a child be seriously ill or not, and a chapter on injuries and accidents. This is not a "domestic medicine" manual, but a plain, practical, and sensible guide for an intelligent mother.

CONSTIPATION PLAINLY TREATED, AND WITHOUT THE USE OF DRUGS. By JOSEPH F. EDWARDS, M.D. Philadelphia: Presley Blakiston, 1881.

This neat little volume of seventy-two pages is intended for the instruction of the public about a subject too much neglected. It treats of the functions of the stomach and bowels; of the necessity for daily evacuations, and how to procure them without the use of drugs. The teaching is plain and the advice judicious.

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## PERISCOPE.

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REPORTS OF CASES.—Mr. Charles Tomes related three cases of abscess of the antrum, in which there had been almost complete absence of symptoms; in two of these were decayed stumps, but in the third all the teeth were apparently sound, and no cause for the abscess could be discovered. He called attention also to the uncertain results of treatment in these cases; some being cured in a few weeks, while in others the discharge continued for years.

Mr. Storer Bennett read notes of a case of necrosis of a portion of the nasal and palatine processes of the upper jaw, resulting from an alveolar abscess connected with a canine tooth. The disease came on acutely after exposure to cold and wet. The patient was a healthy man, and there was no suspicion of syphilis.

Mr. Coleman read notes of a case sent by Waller Bey, of Cairo, in which osseous degeneration of the pulp of two apparently sound teeth had set up intense cervico-facial neuralgia, which immediately ceased on their extraction.

The secretary read a communication from Mr. H. W. Jackson, of Lewisham, in which he stated that for fifteen years he had been constantly subject to the occurrence of boils on the right side of



the face and neck, which had at once ceased on the extraction of the stump of a decayed upper molar, which had set up chronic abscess and fistula.

A communication from Mr. F. R. Lloyd, of Agra, was read by the Secretary, in which he related how he had been able to settle the diagnosis of a tumor of the gum by extracting a carious molar which was involved in it, and submitting portions of the periodontal membrane to microscopical examination. He pronounced the disease to be cancer, although there was at that time no pain and no tendency to ulceration. This diagnosis was afterwards confirmed, and the patient submitted to operation.

A memoir, by Dr. Arkövy, of Budapesth, on Papilloma of the Oral Cavity, was then read. Only four cases of this disease had been recorded: to these Dr. Arkövy added another, which was remarkable on account of the situation of the growth; this was attached to the soft palate. The author described its minute anatomy, pointing out its close relation to epithelioma, and discussed its etiology and surgical treatment.—*Reports of Proceedings Odonological Society of Great Britain, in Medical Times and Gazette.*

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## HINTS AND QUERIES.

"He that questioneth much shall learn much."—BACON.

CORRESPONDENTS desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

WILL there be any advantage in "non-cohesive gold," "wedge fillings" and "lateral pressure," except, perhaps, in an occasional extraordinary case,—if we have a gold with which a filling can be started at the bottom of the cavity, and each piece added sufficiently consolidated before another is introduced, thereby keeping the whole course of the work directly in sight,—*the gold having sufficient cohesion to answer every need, yet working as easily and plially as the best non-cohesive foil now made?*—DWIGHT M. CLAPP.

A YOUNG lady, eighteen years of age, presented herself at my office with the left upper central incisor apparently about a line shorter than its fellow. It only appears short, however, for, on raising the lip, the crown is seen of full size and well-developed. The root, as far as I can determine, is normal. The tooth is sound and in good condition, but it mars her appearance, and she wants something done with it. Can any one suggest what to do in such a case? Is it likely, if let alone, to come down to a line with its fellows?—A. M.

WILL some one inform me of the best mode of taking the impression and making a plate for a partial lower denture,—central incisors, and right and left first molars. The molars and bicuspid incline inward, so that one cannot get an impression with wax.—C. M.

WILL some one give me the *principle* of managing a Bunsen burner so as to produce the most heat without smoke? Why does the gas take fire, sometimes, at the opening intended for the admission of air? Why does it smoke and blacken at times and not at others?—S. E. T.

WILL some one who understands it please state the chemical action which takes place when pink rubber is bleached in alcohol?—G. T. B.

WHAT is the best treatment for alveolar abscess associated with deciduous teeth and roots?—W. C. M.

A LADY, fifty-three years of age, in good health, came to me in October, 1879, when I extracted nine teeth (all there were in the upper maxillary) preparatory to inserting an artificial denture. I did not see her again until May, 1880, seven months after extraction, when I found her mouth thoroughly healed. I then took an impression and made her a plate of S. S. White's dental gum No. 2, which she wore for a short time, when she complained of a burning sensation in the mouth and throat. I examined the mouth thoroughly, but could discover no inflammation in any part of it. The plate had an air-chamber in it. She also complained of a very disagreeable taste—so much so that she was unable to keep the plate in without nausea. I then took another impression, and made a plate of whalebone rubber, thinking that probably the trouble was with the rubber. She wore this plate for a short time, when she returned with the same trouble, only more aggravated. Thinking that probably the sulphur in the rubber was the cause of the trouble, I then lined the inside of the plate with soft rubber, in which there was no sulphur whatever. The same objection was found to this plate as to the others. In November I took another impression and made a plate on celluloid, which she has been trying to wear since that time. I saw the lady yesterday, and she complained of the celluloid plate just as she did of the rubber plates, except that she does not have the bad taste, but says that her mouth burns as if she had pepper in it. Will some one please suggest a cause and remedy?—J. B. McB.

ANSWER TO J. T. W. (February number, 1881, of the DENTAL COSMOS).—Any good galvanic battery will serve the purpose. Use it when the usual methods of producing artificial respiration (Marshall Hall's or Sylvester's) become tedious, and it seems desirable to employ a substitute to relieve the operators. Use a current only strong enough to produce efficient muscular contraction. Too strong a current exhausts muscular activity, especially if continuous. Place one pole of the battery over the phrenic nerve, where the omohyoid muscle crosses the sterno-mastoid. Apply the other pole to the seventh intercostal space, or upon the opposite side of the neck over the other phrenic nerve. Contraction of the diaphragm will follow from either application equally well. Suspend and repeat the application, so as to imitate natural respiration, until the pulse is re-established. A careful perusal of Sansom's work on "Chloroform; its Action and Administration," will give the inquirer a good understanding of the subject.—T. F.

REPLY TO J. T. W.—("Hints and Queries," DENTAL COSMOS for February, 1881.) In cases of suspended animation (produced by anaesthetics) a strong current from an electro-magnetic machine containing two cells will be required.

Muscular contraction and nervous stimulation are the objects desired. To accomplish these, place the patient in the recumbent position (if in the chair) and loosen the garments, in order to operate upon the bare skin with the electrode. Place the positive electrode on the third cervical vertebra, and operate with the negative over the whole region of the chest, the electrodes being moistened. Avoid using the current so strong as to induce muscular soreness after recovery.—J. O. SCOTT, D.D.S.

REPLY TO W. T. J. ("Hints and Queries," DENTAL COSMOS for February, 1881), who asks, "Can a tooth be extracted with less pain to the patient by the use of the galvanic current?"

The writer has employed the following method with fair success: Use a "Kiddler" electro-magnetic machine, or any other giving very rapid vibrations of armature. Place the positive electrode on the gum of the tooth to be extracted, and the negative in the patient's hand or at the back of the neck. Start with a light current, and gradually increase the strength as much as can be borne without producing pain. The electrode applied to the tooth should embrace each side, the better to convey the current. For this purpose it should be bifurcated at the end of the handle, the arms of sufficient length for convenience in operating. At the ends of these solder small disks about the size of a dime. The handle and arms must be insulated, to prevent the current passing off at any other point than the disks. Cover the disks with thick pads of fine sponge. A cylinder electrode is the proper one for the hand, also covered with sponge or cloth. Moisten each with saline water. With those who are timid and not accustomed to the sensation of the electric current, it is advisable to place the electrodes in both hands, gradually increasing the strength.—J. O. SCOTT.

MANUFACTURE OF NITROUS OXIDE GAS.—Generating nitrous oxide is a big bugbear to many, and was to me at first, but I now make gas in a comparatively short time, and with great ease. I first reduce the ammonia (fused) in a wedge-wood mortar to about the fineness of the granulated form; place in a glass retort the required amount and apply heat. It is the application and control of the heat that makes the process troublesome or otherwise. I use a large coal-oil stove with two burners, the stove so arranged as to hold water over the oil reservoir, to keep the oil cool. The burners should be each three inches long, in order to get the required heat. Over the entire top of the stove I place a circular piece of tin plate, slightly depressed from the edges to the center, and cover it with fine sifted sand to the depth of nearly two inches, being careful that no small pebbles are in the sand, as they would endanger the cracking of the retort by irregular conduction of the heat. I gently work the bottom of the retort into the sand to the depth of one inch and pile the sand up around it with a spatula. To the neck of the retort, where it joins the body, I place loosely a wire ring, to which is attached a strong string suspended from the ceiling or other stationary object just above the retort, so that by it I may suspend the retort when the sand-bath is taken from beneath it. This suspension-string should have loops by which to raise or lower the retort at pleasure. All being in readiness, the wicks are lighted (my stove has a small door to it, which enables me to light or extinguish the flames without removing the object heating above it), being careful to have the least flame possible at the beginning and gradually increasing it every five minutes, until the flames are at their largest without smoking, keeping them at this point until all the ammonia is melted. Then, reducing the flames to their minimum, the retort is raised from the sand-bath and held suspended by a loop on the string. The sand-bath is then removed with a pair of strong pliers, leaving the retort directly over the naked flames, which have been previously reduced to their minimum. The retort is then, however, as near to the top of the stove as possible without touching, where it is allowed to remain until the ammonia has all passed over. Now, every five minutes, the flames are enlarged until both are full, occupying the space of about fifteen minutes. By observing these directions a glass retort can be made to last almost forever.—J. E. REGISTER, *Milford, Del.*



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ORIGINAL COMMUNICATIONS.

BLEACHING TEETH.

BY JAMES TRUMAN, D.D.S., PHILADELPHIA, PA.

THE repeated inquiries in regard to the best modes to be adopted to change the color of teeth having devitalized pulps is an inducement to revive the process that I adopted some twenty years ago, and gave to the profession in the October number of the *Dental Times*, Vol. II., 1864, and subsequently in a second article, published in the same journal, Vol VI., July, 1868. As so many years have elapsed since that period, and as a new generation of workers have come on the stage, it seems not only appropriate but necessary that the ideas then inculcated should be republished for their instruction. An additional incentive to this course is found in the fact that a very meagre statement of this process has recently been published in the foreign journals as a new mode of treatment; and, as this is very imperfectly given, practice under it must not only bring the process into disfavor, but is very likely to lead to disastrous results.

The bleaching of teeth is by no means a new idea. It was the subject of frequent experiments by some of the earlier operators, but with only partial success. The interest that environed it, and the necessity that we should have a better mode to remove these unsightly organs, led me into a series of long-continued experiments, with the hope of evolving a process worthy of adoption. It was soon found that any operation, to be of practical value, must go beyond anything previously accepted, and must, also, run in opposition to long-established prejudices. This led to delay in publishing the conclusions, and it was not until several years had elapsed, and doubt no longer existed as to its value, that it was given as the simplest, and, in the judgment of the writer, the only effectual means of accomplishing this object. Seventeen years have elapsed,

and the opinion then expressed has not been altered, nor has there been anything better offered to accomplish this desired result. That but little interest was manifested was natural. It was the adoption of radical means to overcome a great difficulty, and the average human mind does not take kindly to anything or any process that upsets established modes of thought or practice. It has, however, outlived that period, and has become, in the practice of many, an operation regularly performed whenever required.

It is unnecessary to enter into the character of discoloration in detail; it is well understood, and may be briefly classified under three heads:

1st. That produced by the destruction of the pulp-vitality from any of the well-known causes, as from blows, attacks of caries, etc., the subsequent transfusion of the decomposed tissue through a portion of the tubuli lying near the surface of the cavity of decay giving the tooth a dingy-blue appearance. This may occur in teeth affected by caries or in those without external evidence of disease.

2d. The more aggravated cases, from the same causes, where the whole tooth has become so much discolored as to require active treatment for the removal of the disfigurement.

3d. Of the latter we have teeth of a dingy-yellow, with gums in an inflamed condition; root much roughened; tooth somewhat loose in the alveolus; periosteum partially destroyed, and the lesion accompanied at times by a discharge of pus.

In the treatment, these three conditions must be carefully considered, as the prognosis will depend largely upon them. It is evident that the first is merely a superficial discoloration, the most of which can be generally removed with the excavator or drill. The subsequent filling with gold, oxychlorides, or zinc-phosphates will change the color sufficiently without resorting to the bleaching process. Indeed, the latter is only really required for the second class of teeth, for those of the third have become so thoroughly diseased that attempts to restore them can only be regarded as a partial success; but, as no tooth should be lost without an effort, these are not necessarily thrown out of the list of salvable teeth.

*Treatment.*—The fact that teeth with devitalized pulps, however produced, are always liable to be involved in acute inflammatory conditions, must be recognized as an important factor in any treatment attempted. The utmost care must therefore be exercised in the preliminary operations, to avoid unnecessary irritation. The removal of all remains of decomposed pulp from the canal is of vital importance; but this must not be performed in a rapid, careless manner, as a tooth so circumstanced is extremely sensitive to all external impressions. It is of great moment that no inflamma-

tion of the periosteum should supervene, as that, necessarily, not only complicates the operation, but renders it more doubtful of success. The rule to be remembered is, that in proportion to the vitality of the tooth will be the ratio of good results in bleaching.

The removal of the pulp should be followed by a thorough washing of the canal with a five per-cent. solution of carbolic acid. Anything stronger than this may become in itself an irritant,—a fact seemingly forgotten by many who make use of this remedy on all occasions in its full strength. There may be times when this will be required, but they are exceptional, and it certainly is not indicated here.

If this preliminary process has been satisfactorily conducted, the next operation may be proceeded with, viz., that of filling the canal at its *upper third*. This should be done with gold, and must be most thoroughly performed. The agent subsequently brought into use is extremely irritating and very penetrating, hence all avenues of egress to the periodontium must be effectually closed. The question may be asked, why fill only the upper third? Because it is absolutely necessary for success that the root shall be bleached as well as the crown. A failure to remember this will possibly result in a re-discoloration, from causes to be named hereafter. It must be remembered that the pulp-chamber in the crown requires the same careful treatment as that given to the canal. It must be thoroughly cleaned of all *débris* to its fullest extent, and that in the incisor and canine teeth is almost to the enamel-line of the cutting-edges. Failure in this operation here will necessarily result disastrously. I prefer, after cleansing the canal, to follow it with the drill, in order to cut away a portion of the dentine, and also to remove, with the excavator or drill, a portion of the same tissue in the crown. Having proceeded thus far, the case is prepared for the further process of bleaching.

The practice formerly adopted was rather of a palliative character than of any positive bleaching treatment; indeed, but little attention was given it at all. Such has been the singular indifference in regard to it that works on operative dentistry either treated it as of small moment or passed it by as unworthy of any notice. The result is that students in quest of information must look elsewhere than to the text-books for the information desired. While it is true that in the older sections of the country, where the people have for a long period been educated properly in regard to the care of the teeth, this difficulty of discoloration is not as frequently presented as formerly; but it is evident, from the frequent demands for information, that such is not the case everywhere. That the indifference is in part due to the failure of the various processes that have from



time to time been recommended, must be conceded, but it would be well to remember that failure may be the result of a want of manipulative dexterity, of patience in attending to all the details, and, above all, a lack of care in the preliminary treatment. There is, doubtless, much in all the processes that have been recommended. Even the old ones, that aimed only to change the color by mechanical displacement, such as the use of starch, magnesia, etc., had a certain degree of merit. The advance was great when chlorinated lime was adopted, though the full value of this material was not appreciated until a later period.

The possibility of bleaching tooth-tissue is based on the fact that the dentine is permeated throughout by the so-called tubuli. Each of these microscopic conduits is traversed throughout its entire extent by a soft tissue. This much has been positively demonstrated. It has been also demonstrated that coloring-matter can be carried, under ordinary conditions, nearly to the final distribution of the minute ramifications of these tubuli. This is an important point, for without this vascularity, bleaching would be impossible. With it the possibility exists of extending the whitening process to the peripheral border of the dentine, or, in other words, to its union with the enamel in the crown or cementum in the root.

It may be argued, and with considerable force, that if the tubuli are the channels of organic material, this, necessarily, will decompose and become a source of discoloration. This I believe to be true, and, in some instances, it may be the cause of re-discoloration. But this latter difficulty is, in my experience, so exceptional that it furnishes no basis for an argument against the treatment as a whole.

The diameter of the tubuli is so minute—always decreasing in size until lost in final distribution—that any agent used must require considerable time before it can penetrate to the minutest ramifications. This is demonstrated by attempts to color dentine through the pulp-canal. It is an exceedingly slow process, hence, any attempt, in my judgment, to bleach rapidly, must prove a partial failure. The change, if change be made at all, is simply on the walls of the canal, and cannot penetrate to any depth of tissue. If the discoloration is superficial this mode will be effectual, but not otherwise. So difficult is it to penetrate the tissue in a certain class of teeth with large crowns that I have repeatedly spent several months in the vain effort to bleach at the neck. Such cases are rare, and they were taken with the view of experiment. It must be apparent that any agent used should have a penetrating as well as a bleaching power, and, at the same time, must not have a deleterious influence on tooth-structure.

Color can be changed by several of the acids, notably oxalic and nitric. The former destroys the color and the latter changes dark-blue to a yellowish tinge; but, as both of these are destructive, they should never be used except in connection with an antacid. My own experience with the first-named has been wholly unsatisfactory, though it will be observed in the details of Dr. Huey's mode that he uses it in combination with chlorinated lime, and with excellent results. Experience does not warrant me in giving an opinion as to the merits of its use in this connection.

Chlorine free, or in some of its combinations, has been the main reliance for bleaching, and that it has been the most effectual has been demonstrated so thoroughly that any attempt now to assert to the contrary must be regarded as the result of defective manipulation or absolute ignorance. It has great penetrating power, and is a thorough bleacher; it is readily applied, and is harmless. It remains, therefore, only to consider the most feasible, and, at the same time, most effectual, mode for its administration.

As has been already remarked, chlorinated lime was early used, and had a partial success. This was due mainly to the fact that there is a certain amount of acid in the cavity of the tooth,—the result of decomposition. This, brought in contact with the lime, sets free a small portion of the chlorine, but the amount is too small to be effective. Chlorine is liberated by all the acids,—very rapidly by tartaric and sulphuric, and in less degree by acetic. The idea previously advanced being conceded that the penetration of the tubuli must necessarily be slow, it follows that a sudden presentation must fail, for want of time, to penetrate the tubuli; hence the process, so warmly recommended by some, of bleaching by direct contact with chlorine generated in a bottle could only be partially successful.

The use of chlorine in this way cannot be commended, for while it bleaches superficially, it has the objection before mentioned of non-penetrating power, and has another, and a very serious one, of being annoying to both patient and operator. What is wanted is slow action,—the slower the better,—and this process does not meet this demand. This was so clearly manifest in my earlier experiences that I early abandoned all powerful action, and reduced the acids finally adopted to the strength of about a ten per-cent. solution. This was subsequently increased until, at times, I used acetic acid at full strength; but I am still of the opinion that weak solutions are the most effective. It will be apparent then that, having thrown out all the agents mentioned, either from their ineffectiveness or deleterious character, the chlorine compounds alone remain. Of these, experience has demonstrated the chlorinated lime to be the most effective.

The difficulty attending the use of this material is to be found in the fact that it is rare to find the article good. Most of that sold in the shops is absolutely worthless. So difficult has this been that one very successful operator in this specialty prepared for a time his own, but this was found unsatisfactory in a private laboratory. The best plan is to procure it from first hands, having it carefully bottled, and always kept so, as contact with the atmosphere destroys its value.

A variety of tests are used in chlorometry to ascertain the exact amount of chlorine present in a given quantity of bleaching-powder, but as exactness is unnecessary for the object aimed at in this treatment, the operator can, if it is found requisite to test at all, make use of the crude but effectual indigo test. To a solution of indigo in a test-tube, add a small amount of chlorinated lime; to this add strong acid. The rapidity of the change of color will indicate the relative amount of chlorine in combination with the lime. If there is very little change of color, or the bleaching proceeds very slowly, the lime should be discarded as unfit for use. This is more important than it may seem to be; for if the operator is not sure of the quality of his lime, the whole process will be uncertain, and may possibly result in failure. Good chlorinated lime is in the form of a dry powder. In this condition it is exceedingly difficult to insert properly in a cavity.

To accomplish this, proper instruments must be kept on hand and used only for this operation. The best forms are those devised by Dr. Huey, the handles being of socket-form, with bits of gold or platinum. The latter materials are used to avoid the deleterious action of acids. A very good instrument is the Holmes platinum-point plugger, for oxychloride fillings, No. 1. With an additional point, smaller, for packing in the canal, and a bit formed like a hoe-shaped excavator, the outfit will be complete. These cover all the essential ideas in Dr. Huey's instruments. It must be borne in mind that *no steel instrument can be brought in contact with the tooth in this operation*. The neglect of this plain requirement has caused most extensive discoloration. Instruments made of hard wood or ivory will be found nearly equally as good as those made of gold or platinum, and they have the merit of being less expensive.

The next point to be considered is the insertion of the material, which, simple as it seems, requires considerable dexterity. The tooth should be prepared by thorough cleansing of all foreign matter, and then encircled with the rubber-dam. With the lime and acid, have also the gutta-percha ready prepared for immediate application. The difficult point is to bring the acid in connection with the lime, so that, while it may accomplish the work effectually,



there may be no loss of chlorine. I have tried several methods, but I think that of dipping the instrument in the weak acid solution, then in the lime, and inserting this rapidly in the cavity, is the best. It has the objection that it requires very rapid manipulation. Another plan has been to use distilled water to make a paste, and, when sufficient has been inserted, apply a stronger acid by means of cotton wrapped around one of the platinum-points. The objections to this are the stronger acid and the uncertainty attending it. I, therefore, prefer the first mode. When the cavity is sufficiently full, it should be immediately sealed with gutta-percha and allowed to rest for several days. On the return of the patient the cavity and canal should be thoroughly cleansed with distilled water. If the bleaching has not gone far enough,—which will be indicated by the color of the tooth,—a second application must be made, and this must be repeated until a satisfactory result is attained. I have not found it necessary to make more than two applications a week.

The question has been frequently asked, and probably will be again, what effect has this on tooth-structure? From my observations, none at all. If the acid is not in excess,—and it should not be,—there can be nothing deleterious in it, as the affinity of the acid for the lime destroys at once its power to act on the dentine. I have carried the operation, as before remarked, to a period of several months, and have never observed the slightest change in tissue, and I have treated teeth with the merest film of dentine on the labial surfaces, and with equally good results.

The immediate bleaching effect will be observed in the lower third of the tooth where the dentine is thinnest. In the majority of cases this will be effected by one application; the greatest difficulty will be found at the gingival border. Here the dentine is very thick, and, as before stated, it will be very slow work, and end, in some cases, in failure to restore normal color. As this does not, however, materially affect the general appearance, I do not regard it as essential to carry the process to a length of time necessary to effect complete bleaching.

The great objection made to any effort of this kind is that the tooth "will re-discolor." This point has already been alluded to. My own experience is that there is either no return, or in so slight a degree as to be no cause of uneasiness. I have already intimated that this re-discoloration may proceed from the organic matter in the tubuli and the minute branches. If this idea be the true solution, it renders the necessity for slow and thorough bleaching all the more imperative, that the process may be carried to the minutest ramifications; but I must regard it as proceeding, in most cases,

from defective manipulation. Either the root *has not been bleached* or the pulp-chamber in the crown *has not been thoroughly excavated*. It is folly to imagine that the bleaching of the crown will be sufficient. The intimate connection between the tubuli in the root and those in the crown renders this course imperatively necessary; hence, the very great importance of filling only the upper third of the canal.

Dr. Robert Huey has for several years been interested in practical and experimental work with this process, modified by experience, and as his method differs from my own in some of the details, I have requested a statement which he kindly furnishes, as follows:

"The tooth must be thoroughly cleared of all decayed matter throughout the entire extent of the canal and pulp-chamber. Follow this with a wash of aqua ammoniæ, as it has been found that any portion of oily matter interferes with the action of the chlorine. Place the rubber-dam on the tooth and fill the upper part of the canal contiguous to the foramen. Prepare a solution of oxalic acid after the following formula:

"R.—Acidi oxalici, gr. x.,  
Aquæ destillatæ, f℥j.—M.

Have ready the very best chlorinated lime that can be procured.

"I commence the bleaching process by dipping one of the gold instruments in the acid solution, and again in the lime, and carry this as far into the tooth as possible, continuing until the cavity is full. In the course of five minutes this is removed, and the cavity refilled with fresh material, and so continue three or four times in the course of an hour. The largest proportion of cases I have had under treatment have been finished at one sitting. I prefer to use oxalic acid to liberate the chlorine, as the action is more rapid than by either acetic or tritaric, and seems to be more effectual in very difficult cases. If it is necessary to use a temporary stopping after bleaching, I prefer a cement filling to one of gutta-percha. The objection to the latter is that after its use, in some cases, re-discoloration has followed, caused by the admission, I believe, of moisture. The cement filling should not be inserted until after precautions have been taken to dry all the parts of the cavity and canal. For this purpose the hot-air syringe is absolutely essential. Any moisture left in is injurious. The cement filling should have a putty-like consistence. When it is necessary to keep the bleaching material in for a longer period than one sitting, gutta-percha must be employed to seal up the cavity."

## CAPILLARY ATTRACTION IN ITS RELATION TO CONTOUR FILLING.

BY R. H. SHOEMAKER, D.D.S., GERMANTOWN, PA.

WHEN tubes of different diameters are inserted in any fluid which has the property of wetting the substance of which the tubes are composed, the liquid will rise in the tubes above the level of the liquid in which they are inserted, to a greater or less height, according to the diameter of the tube; the smaller the tube the higher the liquid will rise. The height to which it rises may be taken as a measure of the force which raised it to, and maintains it at, that point. Likewise, when two convex surfaces touch or nearly touch each other, and there is a sufficient amount of fluid present between them of a character capable of wetting the substance of which the surfaces are composed, the fluid will be held between them in a manner as represented in Fig. 1.

FIG. 1.

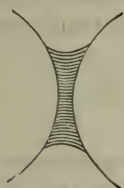


FIG. 2.



FIG. 3.



The fluid will be held between the surfaces by the force of capillary attraction, increasing as the surfaces approach the point of contact; but if the surfaces are pressed together with sufficient force, there will not be any liquid between them at the immediate point of contact (Fig. 2).

Applying these principles to the teeth, we find their approximal surfaces exercising a capillary action on the fluids of the mouth, in the same manner as the convex surfaces above mentioned. I shall confine my attention in this article to the spaces between the molars and bicuspid, as these have always presented the greatest difficulties to successful filling, although the law holds good between all the teeth. Without discussing the various theories of the causes of decay of the teeth, I assume that the moisture or fluid must always be present in the mouth, and that it exercises a destructive influence.

Let Fig. 3 represent the buccal aspect of two molars and a bicuspid. The fluid of the mouth is held in the triangular spaces between the teeth and gum, the greatest attractive force being exercised just below the point of contact; consequently, whatever is deleterious in the fluid will remain in contact with the teeth at this point, and will require more than the ordinary movements of the oral fluid to dislodge it.



It is at this spot, indicated by *a* (Fig. 3), that decay between the teeth almost invariably commences, and not at the point of contact. In fact, we often find the point of contact bright and hard where the teeth have been close together. From this point of greatest influence the decay will spread gradually, until it reaches a line of demarkation determined, on the buccal and lingual sides, by the freely-flowing fluids of the mouth and by the action of the food in mastication, and at the neck by the margin of the gum, and no further. The after-progression of the decay will be in the deepening of the cavity. The same effect of this capillary attraction is seen on the buccal aspect of the second and third molars when they are close enough to the cheek to produce the capillary action.

If we apply the rubber-dam to a tooth slightly decayed on its approximal surface, and, after thoroughly drying the surface, attempt to polish it with corundum tape, we find that the integrity of the enamel has been impaired far beyond the margin of the cavity; in fact, just as far as the capillary drop we have been considering has been held in contact with tooth-structure. The amount of surface this will involve, will depend upon the relative destructiveness of the oral-fluid, the time during which it has been acting, and the resistive power of the tooth, modified, of course, by the amount of care bestowed by the individual in cleaning the teeth.

Now, I maintain that this capillary action is certain and persistent whenever the spaces between the teeth are narrow enough to permit it, no matter what shape the space may be, and that decay will sooner or later inevitably occur at the point of greatest influence, unless the teeth are of such a density as to be able to resist successfully the destructive agency brought to bear upon them, or the individual takes sufficient pains to cleanse the spaces.

Let us now consider the effect of this law upon our work as heretofore done. Whatever criticism I make in this regard, must be understood as including my own practice, for I pursued the usual course of separating teeth for filling until within a few years past. No one need reply *tu quoque*, for I freely admit it. But as one who has gone through evil ways and has reformed is thereby often better prepared to help those out who are still in error, so I hope I may induce some one to give up the ruinous practice of separating the teeth. As I was educated in the firm belief of the advantage of the practice of separating, it required much proof to convince me of its error. As I continued to gain experience with time, I began to see that the failure of approximal fillings by recurrence of decay in the spaces under consideration, was a foregone conclusion, sooner or later, generally sooner, according to the relative positions of the teeth. I do not mean that my own fillings alone failed thus, but

that I found the fillings of others high in the profession failed in just the same way, until I was almost inclined to confess that, in this respect, Dentistry was a fraud. Has not every one heard a new patient say, "How is it that whenever I go to a new dentist he removes all the previous fillings?" Or, "My former dentist tells me that my teeth always will decay around the fillings, the teeth are so soft."

But when I began to consider the influence of this capillary force, I concluded that we were attempting to accomplish what was virtually an impossibility, and if it had not been for our present improved appliances, I should have despaired of filling certain cavities with gold, with any expectation of the fillings lasting long. Now, however, I have learned a better practice, and I think it is high time that others who are still pursuing the plan of separation, should pause and think this matter over, as I have done.

For the purposes of argument, let us suppose that all fillings are put in actually moisture-tight,—vain supposition, however, but that is beyond my present essay. I shall make no distinction between teeth separated and filled, and those separated without being filled, as all my reasoning applies equally to both. Without considering all the discomfort of the exposed sensitive dentine, and the tenderness of the gum consequent upon the separation, have the separated teeth become free from the capillary action? By no means. As separation is generally performed, we have an aggravation of the circumstances. The dentine is now exposed to the deleterious fluids, and has not nearly so much power to resist their action as the enamel had. I grant that you can make *enormous* spaces between the molars, which will allow the free movement of the fluids of the mouth, and thereby make the teeth comparatively safe from a recurrence of decay, if (and this is very essential) the gum fill up closely the space towards the root of the tooth beyond the point of contact of the tooth. But what a ruinous loss of tooth-substance this involves! If such spaces are made between the bicuspid, there is nothing worthy of the name of a tooth left. Far better would it be to extract the tooth, and thus obtain the desired space, than make such a separation.

What is the condition of a set of separated teeth? You have all seen them—jumbled together and leaning one against another in a manner calculated to dishearten any one who expects to have future charge of them. They never come together, after being separated, with their long axes parallel to each other as they stand normally in the jaw, so as to make the orderly spaces described or pictured by those advocating this plan. But some one may reply that he does not separate beyond the point of contact, but allows them to touch

at the same points they did before being operated upon. That is rarely possible. Take, for instance, teeth of normal shape which are bell-crowned, as in Fig. 3. The vulnerable spots are at *a*, below the point of contact, and they must be separated below that, or nothing is accomplished towards the safety of that special point. Then the teeth come together again at a new point of contact, and now we often find two vulnerable spots instead of one,—that is, one spot affected by the capillary moisture above the point of contact and one below. How often do we find, under such circumstances, that the decay recurs below the point of contact, and reaches so far down the neck of the tooth as to make one despair of filling it with anything but gutta-percha. We sometimes meet with teeth of such shape that they can be separated down to the gum without destroying their point of contact; but it is so seldom that it is not worth taking such possibilities into consideration, for even such teeth would be better filled on the contour principle. What is the history of teeth treated on the principle of the separationists? One after another the fillings have to be renewed and more tooth-substance cut away. From the cases which have come to me from other dentists, I am inclined to think that many a one has become virtually a "new departurist," because he has failed in attempting to do what I claim is *impossible*. Finally, after a few generations of fillings, the tooth breaks down, and is extracted. Now we have spaces by the loss of teeth, and the remaining filled ones will last,—not because of the perfection of the fillings, but by reason of the wide spaces thus secured, freeing them from capillary action. Surely this should not be called successful dentistry; there must be something better than this in the future.

Greater success will certainly be found in the contour principle of filling. It is not pertinent to my present purpose to enter into a description of contour filling, as that has already been done in these pages. I only desire to show that the result of capillary action is such that no teeth, filled or separated in such a manner as to remain subjected to its influence, can be safe from a recurrence of decay for any considerable length of time. For if the teeth have surrendered to decay while covered with enamel, they most certainly will succumb again after they have been made more vulnerable than they were before. I repeat that the present mode of separation does not free the teeth from this capillary action. How, then, can they be freed from this action? Only by contour filling. They must be so filled, that nothing but the filling material shall be liable to be thus acted upon. The margins of the fillings must be beyond the line of demarkation, and just in proportion as they are freed from this capillary action, will the success of the filling be; provided, of course,



that it has been properly inserted, and is moisture-tight. The comfort of a patient with teeth thus filled, is incomparably greater than when the teeth have been separated.

This method of filling, is no doubt difficult, sometimes very difficult; but the satisfaction of seeing patients return with teeth just as free from decay as when the fillings were inserted, will certainly induce to the conclusion, that it pays to take the necessary pains and time; pays, not pecuniarily, for it does not, in comparison with the separating mode, but it does pay in the consciousness of having done the best for one's patient. If we do not adopt this plan, we had better imitate the honesty of the "new departurists" in refusing to insert and reinsert gold fillings which we must acknowledge to ourselves will last for but a comparatively short time.

Young practitioners especially I would advise never to pass a file or corundum wheel between the teeth, impairing their shape, and thereby sowing the seeds of a harvest, which they will one day gather with regret, when their patients return to them again. If a case is too difficult to be mastered perfectly on the contour principle with gold, it is better for the patient, and better for one's own credit, to fill it perfectly in like manner with amalgam, than to simplify the cavity by a permanent separation of the teeth.

### OPERATIVE DENTAL SURGERY.

BY W. FINLEY THOMPSON, M.D., D.D.S.

(Delivered at the National Dental College, London.)

OPERATIVE dentistry, like surgery, has its separate relations, on the one hand, to pure thought and deduction, and on the other, to mechanics; by the latter I mean the dealing with bodies and forces, whether it be the teeth or the application of instruments.

Dentistry, however, cannot be contemplated as an abstract study, although the time may come when we shall have consulting dentists, as we now have consulting surgeons.

Of esthetic dentistry, it must be admitted that theory is effective only so far as it is blended in intimate relationship with practice.

Your attention is now directed to—

*First.* Preparation of cavities.

*Second.* Introduction of gold into cavities.

In calling attention to these two points, I do so with the object of investigating their direct bearing upon operative dentistry as a whole, in connection with the speedy accomplishment of purposes to be attained in that department.

I apprehend that your aim is to acquire a proficiency that will enable you to deal with the matter in its various forms, for purposes

therapeutic or prosthetic; so that the training of the hand must, for the overcoming of material difficulties, accompany the acquisition of knowledge. For this purpose the student should endeavor to witness operations of varied character, which, in his coming professional life, he may be called upon to perform.

A quick comprehension of the exact requirements of each case, with the power to effect a rapid execution of the same, will materially advance those engaged in the study of dentistry. The "value of minutes" cannot be overestimated while operating, so that the perfect arrangement of instruments previously may be considered a distinguishing feature in the preparations made. Attention to minute detail, however, must not engender habits of laborious idleness, or detract from the concentration of thought which embraces an entire operation before its commencement.

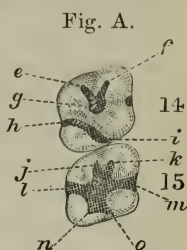
Each application of the instrument should be made for a specific object, and, the moment that object is attained, the next process must follow in quick succession. If a rest be required, it is to be distinctly taken as such, and not indulged in at the expense of time employed in the operation. An awkward or irresolute manner of selecting an instrument is an evidence that the brain and hand are not in unison. By rapid manipulation I do not wish to convey the impression that I favor undue haste, involving uncertain action or jeopardizing the work. But a waste of time is to be deprecated in operations of an extended character, and can, in a measure, be avoided by a well-defined and accurate calculation of the requirements of any particular case, conjoined with a systematic carrying out of the same.

Refrain from unduly sacrificing any portion of the healthy tooth-structure; yet do not hesitate to use the instrument freely upon all surfaces presenting a doubtful appearance, following out the decay, whether interstitial or superficial, to its periphery. Previously, however, to the introduction of gold,—presuming that the several walls are carefully shaped and dressed,—the finest emery paper may be employed to nicely polish the outer edges of the cavity, as there will always be a feathery or notched condition of the external enamel after the most careful preparation with instruments. When teeth standing closely impacted are decayed upon their approximal walls, it is necessary to wedge preparatory to operating, that a proper inspection may be made along the facing surfaces. As a rule, complete exposure of the parietes, as well as of the floor of the cavity, should be made previously to the introduction of the gold; for, if the operation be conducted under the disadvantage of an uncertain light, there must necessarily exist some doubt as to the stability of the work performed.

In shaping the cavities, I would discourage the formation of severe or acute angles, for they are not so easily or solidly filled as when the surfaces are united by a portion of a circle. The walls are also strengthened by this, while an angle is likely to favor the formation of a fissure at the angular point. Having a knowledge of the ramification of the canaliculi with the life-sustaining circulation which is by some believed to exist in them, try to form the walls of the cavities in lines running as nearly as possible in the direction of the dental tubuli. Although theoretically correct, this cannot always be carried out, as the cavities would, in many instances, be of the shape of an inverted truncated cone. But, if this object cannot be attained, the aim must be to so shape the cavity as to avoid undercutting, which, by widening the floor, would necessarily divide many of the anastomosing ramifications. Under-cut cavities do not, as a rule, retain the gold so well as those with vertical walls. Although that form of cavity may prevent bodily expulsion of the filling when loose, it cannot be esteemed an advantage, for a detached filling is better lost than retained in its uncertain tenure of position, deceiving, as it does, the patient, and not infrequently permitting caries to extend without the invariable warning being heeded—this false security causing, as it may, the ultimate loss of the tooth.

Reviewing the different stages under the classification as given in Lecture IV,\* I will now direct attention to the first, viz.: "The inception of decay with primary evidences of disintegration."

In Fig. A is shown the method of preparing and filling cavities in this stage. I have heretofore in general terms described morbid tendencies as exhibited in the teeth, and, from the fact that these early indications of disease are apt to receive hurried attention, I have endeavored, by the diagram before you, to illustrate cavities of this description as filled. Here it will be observed that the restoration, as exhibited on the plan of the teeth, may be irregular or even stellate. Disease, as herein pictured, often commences in an insidious manner, giving but little warning of the extensive waste of tissue; but it is sometimes manifested in a form so pronounced that its presence becomes a declared fact at once. The progress in the one is generally slow, and in the



\* "1st. The inception of decay with primary evidences of disintegration.

"2d. An advanced stage of caries with encroachment on the pulp.

"3d. A condition of disease involving a partial or complete exposure of the pulp, without necessary loss of the same.

"4th. A broken-down condition of the tooth-structure, complicated with pulpitis and death of the pulp."



other much more rapid. If the decay be superficial, with retarded action, it is an indication that nature is assuming the defensive by active resistance to the destructive agencies acting upon the remaining healthy tissue.

In Fig. A, sub-figure 14, *e, f, g*, may be seen a cavity filled in the ante-proximal medial point, extending along fissures in the direction of the ante-buccal medial and ante-lingual medial points.

In the post-proximal medial point the filling extends from the linguo-cervical portion of the tooth, to the post-proximal point *h, i*.

In sub-figure 15, *j, k, l*, and *m*, represent a filling as previously illustrated in decay, while *n* and *o* show the general breaking down of the structure between the previously existing interstitial points, with a coalescing of the same.

While sub-figure 14 in the above depicts the first stage of disease, it likewise delineates a feature in the preparation of cavities that I may not again have an opportunity of so plainly illustrating. In this figure the greatest depth of the caries is at *g*,—*e* and *f* showing the termination of superficial decay, at which points are located anchorages. Situate in the post-medial region will be seen a filling, the necessity for which was caused by decay that had extended transversely across the tooth, radiating from a point in the post-medial to the linguo-medial region, as shown at *h*, and to the post-proximal, as shown at *i*. This form of decay sometimes winds over and upon the lingual-wall, until it gradually fades away upon the cervico-lingual border of the tooth. Sometimes upon the occluding surface of the lingual border is found a malformed cusp, with its base surrounded with fissures, some of which are very deep. When decayed at its base, it is better to remove the cusp, and restore its friable foundation to the normal contour of the tooth.

In sub-figure 15 we have, radiating in every direction, a restoration of the lost portion of the tooth by filling in the deficiency with gold. The letters *j, k, l, m, n*, and *o* represent the extension of decay, but the filling being superficial in these distal points, and therefore deficient in resistance to change of form, anchorages are necessary in each of the angles and peripheries indicated by the letters. Here will be found an arachnoid spread of caries, which, continuing in the interstices, radiates in every direction from the central point of offense. When these lines of disease are left, they not only increase and insidiously undermine the filling, but they frequently invade the pulp-chamber before any warning of danger is made to the patient. It is not necessary for me to add that on the careful restoration of these interstices depends very much the permanent retention of the filling, for the restorations of gold, in this case, are but filaments lying in channels of diminutive size, and would be

forced from their point of contact with the tooth, unless well anchored at their distal ends.

Particularly should it be observed that every joining edge is perfect and exactly adapted, so as to follow the minute deviations and changes of surface which will occur within very limited spaces on the teeth. This important condition being absolutely fulfilled, the circumscribed outline of the filling, considered as a solid of irregular form, will mathematically coincide with the boundaries of the cavity. To better define my meaning, I would have you notice the different characteristics in the ante- and post-medial cavities,—the one class being circular in shape, while the other extends over the tooth in a nearly transverse direction, sometimes beyond the occluding surface and over upon the lingual wall. These cavities require more care than skill, yet it is not an infrequent occurrence to find operations upon them indifferently performed; especially may such a result be looked for in the post-medial cavity, where, by the undermining of the work, it becomes necessary to treat the second stage.

In the inferior molars are also found several depressions, favoring the invasion of disease; and, when decay manifests itself in two of these dips simultaneously, the intervening wall is soon broken down, resulting in a merging of both cavities into one. Then, again, there are found small grooves or sulci, diverging at right-angles across the tooth, which, unless cut out to their extreme distal points, must necessarily involve the destruction of any work bestowed upon them. These irregularly-creeping clefts indicate defective calcification or unification of the enamel, the columns having failed to coalesce at these lines of juncture. The fissures, although imperceptible in a hasty examination, have walls diverging as they approach the dentine, where a morbid condition is induced by the infiltration of the fluids of the mouth through these gateways into the body of the tooth, the dental tubuli fast disappearing under the influence of those corroding agents, disintegration continuing until the disease assumes a more pronounced form.

In the commencement of decay upon buccal walls of lower molar teeth, where a softened condition of the dentine is found running up to or near the occluding surface, it is required to use the fissure-bur. In the medial buccal surface, where the cavity is small and circular in form, the fissures above and below being pronounced are to be cut out and filled, thereby preventing extension of decay followed by final loss of the filling. This must be followed out until there shall exist no points, intermediate between the central cavity and the peripheral ends of the excavated channels, not fairly opened and fully exposed to view.

Before taking up the second section of our subject, I shall occupy a few moments in referring to some of the substances which are incompatible with gold.

It would be supererogatory to speak of its metallurgy further than to mention that, by various chemical processes, gold is supposed to be prepared absolutely pure for dental purposes.

When we consider that a "single grain, the first cost of which is about two-pence, can be beaten out into a leaf which will cover seventy-five square inches," its wonderful adaptability is at once apparent, so that it becomes only a question to decide in what manner it can be most effectually manipulated for dental purposes.

Considered in its purity, there are many opposing agents in connection with its use that require to be carefully guarded against; and the cause for the recognized well-known differences of "cohesive" and "non-cohesive"—under one or other of which all the preparations of gold used in filling must be included—can only be attributed to the peculiar molecular arrangement of the particles caused by the mechanical and chemical forces which have been brought to bear upon it.

The condition under which it can exist as a simple body is limited within narrow bounds; for, by the process of annealing, which is simply heating to a blush under certain precautions, the non-cohesive is immediately changed to cohesive. The recognized differences are simple; but there are failures, the causes of which, to the chagrin of the operator, are unrecognized, the origin of the intractability being occult or undefinable.

The cohesiveness of metals like gold and lead, in the solid state, depends upon chemically clean surfaces. In the lead, such a surface exists at the moment of its being cut. But lead oxidizes, and the thin film formed by the oxidation very soon prevents cohesion. Gold, a metal of higher virtue, does not so oxidize; therefore, with proper precaution it may be preserved cohesive for an indefinite period.

But, however pure, it possesses the common liability of bodies to the influence of the laws of adhesion and condensation. Therefore foreign substances, such as moisture, smoke, the motes of the air, exhalations, the natural sebaceous exudation which continually rises to the surface of the epidermis, and a lack of precautionary measures in removing it from the fingers, will act as impediments to its use. Any one or all of these may cause a thin film or deposit, which, although imperceptible to the unaided senses, may be subversive of that condition of surface which alone insures perfect cohesion.

Experience has shown that, owing to peculiar atmospheric changes,



or to reasons not traced, the gold has been capricious or has worked with less facility on certain days. The causes for these irregularities, I believe, would be found in varying emanations from the busy centers of industry and social activity, towards which the dentist naturally gravitates. That these atmospheric or other hindrances may, as far as possible, be overcome, it is better to procure and retain the gold in a non-cohesive state until required, when it should be properly annealed.

Gold is manufactured into many different forms, among which are ribbons, blocks, cylinders, pellets, crystal, or sponge; also heavy foils, of No. 20, 30, 60, and even higher numbers are employed, but No. 4 has thus far stood firmly to its position in advance of all other preparations for general use. The heavier numbers, like sponge or crystal gold, seem to have had a spasmodic popularity only, for at present they are used in a much more limited way than heretofore. Foil is used cohesive as well as non-cohesive, and both forms have answered a very good purpose; some claiming a preference for the soft. Unquestionably, gold, in its non-cohesive state, is a much safer material in the hands of an inexperienced or indifferent operator; and I am firmly of the belief, that cohesive foil has been an injury rather than a benefit to the profession at large, as it is generally used. Knowing this to be the case, the peculiarities of this metal should be studied.

The resisting properties of gold to corroding influences, as well as its ready adaptability to the inequalities of the surface to which it is applied, cause it to occupy an unimpeachable position as a specific metal to oppose the influences of morbid changes in the teeth. Should there, however, be any neglect to observe the conditions of its use, these natural attributes seem to become perverted, presenting to the mind a parallel to moral depravity; for, while a portion will be amenable to the instrument, there may be, on the part of the remainder, an abrupt refusal to coalesce under any treatment, and it becomes harsh and quite intractable to the purpose for which it is intended.

Used in the cohesive form, however, it possesses undisputed distinctive advantages as a material for general adaptation over gold in a non-cohesive state, which render many operations possible—especially in the more advanced stages—that would not be attempted with other material. But the conditions under which this form may be employed to secure the full benefit of its distinctive qualities are so complex, and the inherent difficulties of its application so great, that many operations have failed, not from want of virtue in the material, but from the practitioner undertaking that which is beyond both his power and experience, and which, with soft gold,

would have resulted better in such hands. These failures have been laid at the door of the profession generally, and to cohesive gold in particular, instead of being attributed to the incompetency of some of its members. The advantages of its use in a cohesive form have been a snare to many; for, although this attribute has its intrinsic value, yet the indications to insure this primary recommendation are such that the neglect of some essential will endanger the work in cases where necessity for its use is demonstrated. Therefore, its employment in a cohesive state has not resulted in an unmixed benefit to the profession; in fact, so many of its fine working qualities have been negatived by indifferent manipulation, when employed in cases where its application was contra-indicated, that it has been unfavorably commented upon.

I wish to lay particular stress upon the advantage of procuring gold in an unannealed condition. With every precautionary measure upon the part of the manufacturer to prevent change in the foil, previous to its use by the dentist, the various causes I have enumerated are ever antagonistic to the preservation of the virtues which particularly recommend it as a filling material. Should a state of pronounced declension be established, a series of complications, greatly to be dreaded, may result. When recourse is had to a second annealing, it will be found, contrary to expectation, that the better nature of the gold will be still more perverted, and that it will become stiff, harsh, and tinny.

The simplest application of the foil is in interstices, in grooves, in pulp-canals, and in very small cavities, where cohesive gold is used by being torn piece by piece from the leaf, with annealing pliers; but, in cavities of larger dimensions, the leaves, whether cohesive or otherwise, may be used in a manner adapted to the size of each cavity. Various methods are adopted in preparing it previous to its introduction into the tooth, to enable it to be directed with accurate precision to its destination.

One of the forms favorable to use presents a flat surface. By folding the leaf into four,—that is to say, twice in the same direction,—a parallelogram is obtained, equal in length to the original sheet, but one-fourth its width. This folded leaf of gold is then sub-divided by cutting across its smaller extension at distances varying from one-eighth to one-half, or even a full inch apart, these quadrupled bands being always of cohesive gold.

The folding is at the convenience or personal inclination of the operator, into fourths, thirds, half of, or even a whole sheet. In the latter cases the foil is usually rolled into ropes—preferably with a napkin—to effect that purpose. Where the foil is to be used in the cohesive state, these ropes are cut into convenient lengths,

and annealed by being passed rapidly through the flame of a spirit-lamp.

Another method of preparing is by crimping, and this is accomplished by laying the leaf on a tin plate, one end of which is bent at right-angles to the plane of its surface, while another plate, similarly bent, is placed upon the first, the bent ends being on opposite sides of the foil. Guides preserve the parallelism of the plates, which, when drawn in opposite directions, cause the gold to become crimped in proportion as their turned margins approximate each other.

Soft gold, being rolled into ropes and introduced into the cavity, is impressed in layers until it rises above the orifice. By impaction it becomes fixed in position through mechanical force, friction, and interlocking. Where there are good walls against which to pack, great solidity can be obtained, and the filling can be made impermeable and lasting. Soft gold, in ropes, is perhaps the most expeditious form for filling, and, in some cavities, proves an excellent preservative of the teeth.

Many of the imperfect and porous fillings so often seen result from a too rapid packing, or from using gold that is too thick; then, again, it is often pounded until it really loses much of its cohesiveness; instead of being impacted against the walls of the tooth, it is driven from them—the excessive vibratory motion partially destroying the close contact previously attained. Light and prolonged tapping will better unite the particles of the gold, and also cause it to more readily adapt itself to the interstices in the walls of the tooth, when used thin and introduced with gentle force into the cavity. By an intelligent appreciation of the necessity for co-adapting the molecules with reference to the mass to which force is to be applied, it may be stated that the use of small instruments in condensing will give greater coercive force to its particles than could be accomplished by more diffused, though heavier blows. The necessity for *delicate, rapid, and light manipulation*, cannot be overestimated in operative dentistry, as it is the *acme* of our profession. *In fact, manipulation may be considered the apex of the pyramid, the base of which are knowledge and practice.*

It may be supposed that more time has been devoted to this primary stage, and to the preliminary measures than they deserve. The importance, however, of effective treatment at the inception of disease, to prevent the following stages, has its full significance, for upon accurate views respecting it depends altogether the success of measures adopted.



## REGULATION OF TEETH MADE EASY BY THE POSITIVE SYSTEM.

BY J. N. FARRAR, M.D., D.D.S., NEW YORK CITY.

(Continued from page 235.)

## No. XIV.

## SPREADING OF THE ARCH.

*Reasons of Success and Failure of Mechanisms Depending upon Unaided Impingement, Arising from Position and Shape of Teeth.*

THERE are two means of retaining regulating devices in position :  
 1st. By impingement against the teeth, perhaps more or less assisted by the unevenness of their surfaces. 2d. By binding with strings, wire, bands, or, perhaps by lodgment on surplus plugs in cavities.

The diversity of experience, and the lamentable frequency of failures in attempts to regulate teeth, due to ignorance of the laws of action and reaction of forces, have made it seem highly proper that a paper be devoted to the problem, giving the reasons why. As a matter of course, such a paper must be somewhat mathematical, and on this account, may to some appear dry and uninteresting, but not to those who comprehend the importance of the principles involved; and to those who do not fully understand the subject the discussion will not only be beneficial, but it may lead to their greater success in future efforts in the art of regulating teeth.

These different methods are often combined; but, in order to more clearly explain the philosophy of applied forces, they will first be treated separately, after which the reasons for their necessary association in many cases, will be apparent.

The usefulness of any mechanism held in place simply by impingement, such as the ordinary jack-screw, plate with pegs or screws inserted in the edge, or any other form of unaided plate, depends upon the relation of the *plane of the applied force*, to the *plane of the surface of the teeth acted upon*, and it may possibly be influenced in a small degree by the *plane of the resistance of the tooth and socket*.

Differing from the principle of the blow and rebound, caused by *suddenly-applied force and rapid motion*, as in the playing of billiards, the science of regulating teeth by artificial appliances, depends upon conditions of the laws of force which control the behavior of slowly-moving solids while remaining in contact. To more clearly differentiate these two elements of relations, let us examine them side by side under the form of two propositions.

For convenience of demonstration, the following terms will be used throughout the paper :

1st. *Applied force* is the force applied by the mechanism, or its equivalent, to teeth to be moved.

2d. *Point of contact* is the point (D, Fig. 82) at which the force of a mechanism is applied to a tooth to be moved.

3d. *Plane of applied force* is the shortest line between opposite points of contact across the dental arch (DD, Fig. 83).

4th. *Plane of surface-resistance* is the plane (BB, Fig. 82) of that portion of the surface of a tooth where force is applied.

5th. *Perpendicular line* is a line (PP, Fig. 82) passing perpendicularly through the apex of the root of a tooth while in the jaw.

6th. *Plane of tooth- and socket-resistance* is the direction of the tooth- and socket-resistance (RD) against the mechanism. This line (RD) is a curve, the radius of which is equal to the distance between the apex and the "point of contact," as ED. This line (RD), although slightly curved, on account of the greater movement of the crown than the apical portion of the root, is nearly parallel with the short axis (DU), and may or may not correspond with a line (DA) drawn at a right-angle to the surface-plane of resistance (BB), depending upon the shape of the crown, as will be demonstrated later.

From these definitions it will be seen that the term "surface-plane resistance" is different from "plane of tooth- and socket-resistance," and, while it is possible that both forces may be in nearly the same line, under conditions as shown in Fig. 92, under others, as shown in Fig. 96, they may be quite different.

For clearer diagrammatical demonstration of the different directions of forces, refer to Figs. 83 and 84.

FIG. 82.

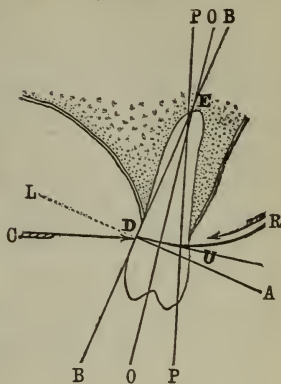


FIG. 83.

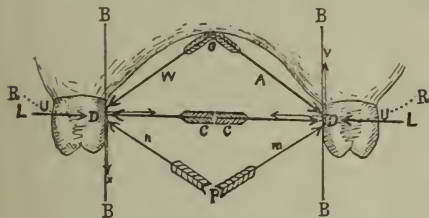


FIG. 84.

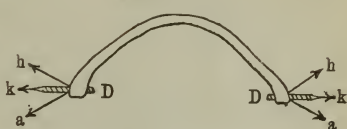


Fig. 83 represents a section of the upper jaw, made through the bicuspid teeth. The arrows o, c, p indicate different directions of forces often attempted in the spreading of the arch. DU indicates the transverse diameter of the tooth, which, in this figure, also corresponds nearly with the plane DR of tooth- and socket-, as well as surface-plane (BB) resistance.

Fig. 84 represents a section of a roof-plate, showing, by arrows, the same different directions of applied forces (proper and improper). Making use, for the present, of the geometrical lines in Fig. 83,

let us now compare and carry along parallel the conditions and consequences of rapid and slower motion.

### FIRST PROPOSITION.

*In order to obtain scientific accuracy in regulating teeth by impingement, the direction of applied forces should be made on the plane of the shortest line, between the opposite points of impingement, by the mechanism across the jaw.*

(This does not imply that fixtures must be like straight rods or flat plates, for, if the points of impingement in the arched plate (Fig. 84) be in the line of the arrows *k, k*, the forces would be as truly on the plane of the line *DD* (Fig. 83), as if the plate were flat.)

#### ESTABLISHED PRINCIPLES OF RAPID MOTION.

*First Rule.*—Should a solid (at *c*, Fig. 83) under *rapid motion* meet at right-angles the plane (*BB*) of another solid at its center of equilibrium of inertia (as at *D*), the momentum of the moving body (*c*) would either carry itself onward, in a straight line, pushing the other before it, or it would rebound upon its own track.

*Second Rule.*—But should a *rapidly-moving* solid (as *O*) meet the plane of such a body at any other than a right-angle, the path of the moving solid would either be more or less bent in its onward course, or it would rebound in an opposite angle, or both results would occur.

#### ESTABLISHED PRINCIPLES OF SLOW MOTION.

*First Rule.*—Should a *slowly-moving* body from the direction of *c* be in contact at right-angles with the plane of a solid at its center of equilibrium of inertia (as at *D*), the pressure would not only be forward on a direct line *DL*, but would also be backward upon the line of its path (*De*).

*Second Rule.*—But should the direction of a *slowly-moving* solid be any other than at right-angle, as *PD*, or *OD*, or at one side of its center of equilibrium of inertia, the, onward as well as the backward pressure would be bent out of a direct line, and its motion would be a glide along the surface-plane, corresponding to the onward side of the obtuse angle, as *DV* or *DX*.

The second column contains that which interests us, but, as one end of a tooth is in a measure fixed in its socket, and as the movement of a tooth generally hinges on its apex, and as the opposite end is free, and its center of equilibrium of inertia, or that balancing point which would enable the tooth to be moved bodily directly forward, is generally within that portion which is buried beneath the surface of the gum, some features of the rules of action of solids under slow motion laid down, cannot strictly be applied; still the principles involved are sufficiently shown for clearness of apprehension.

In accordance with the foregoing, it will be seen that, while the tightening of a mechanism (Fig. 84) for the purpose of advancing the operation by means of screws so applied that the force will be in the line of the arrows *k k*, will practically cause its retention by friction or impingement, the extension of screws in the direction of



the arrows *h h*, will tend to draw the plate from the roof of the mouth, or, if the plate is forcibly retained, the screws will creep along the surface of the tooth and encroach upon the margin of the gum. On the other hand, while the screws, if set in the direction of the arrows *a a*, will not, by their advancement, draw the plate from the palate, the points will slide along the surface of the teeth in the direction of *D* or *x* (Fig. 83), rendering the device loose and impracticable. What is true of screws will apply equally to wooden pegs.

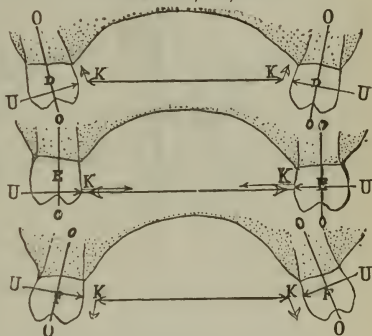
Let us now examine the second proposition, which will show that shape and position are quite as important considerations as the proper application of forces.

### SECOND PROPOSITION.

*Position and shape of teeth govern the applicability of the principles of the first proposition.*

(A preparatory idea may be obtained by reference to Figs. 85, 86, and 87, which represent different stages in the process of spreading the arch. The arrows *K K* indicate the tendencies of plates applied in accordance with the rules of established principles of the first proposition, and show that, while an impingement-plate is practicable under the condition of Figs. 85 and 86, it cannot be so when the teeth have assumed the position of Fig. 87,—a condition that calls for extra means of retention by *binding* referred to.) Under this proposition (second) the different circumstances may be included in two rules,—reference being had to Fig. 82.

FIGS. 85, 86, 87.



ESTABLISHED PRINCIPLES IN REGARD TO THE RELATION BETWEEN THE DIRECTIONS OF FORCE AND RESISTANCE.

*First Rule.*—Barring great abnormality of the crowns from deep pits or grooves, mechanical appliances depending upon unaided friction or impingement are impracticable when the extended mesial extremity (*DL*) of the line of direction of surface-plane resistance (*AD*) falls on or within the jaw side of the line of applied force *CD*, Fig. 82.

ESTABLISHED PRINCIPLES IN REGARD TO THE RELATION BETWEEN THE DIRECTIONS OF FORCE AND RESISTANCE.

*Second Rule.*—Barring great abnormality of the crowns from deep pits or grooves, mechanical appliances depending upon unaided friction or impingement are not practicable when the extended line of direction of surface-plane resistance (*DL*, Fig. 82) falls outside of the plane of applied force (*CD*).

For demonstration, let us refer to the following figures:

Figs. 88 to 96 inclusive, which are various modifications of Fig. 82, represent corresponding sections of half upper jaws, showing

FIG. 88.

FIG. 89.

FIG. 90.

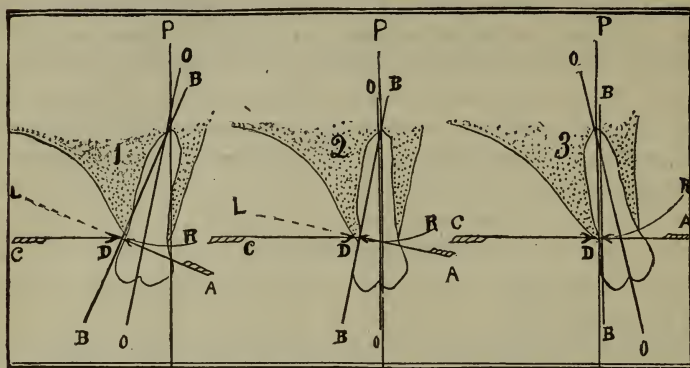


FIG. 91.

FIG. 92.

FIG. 93.

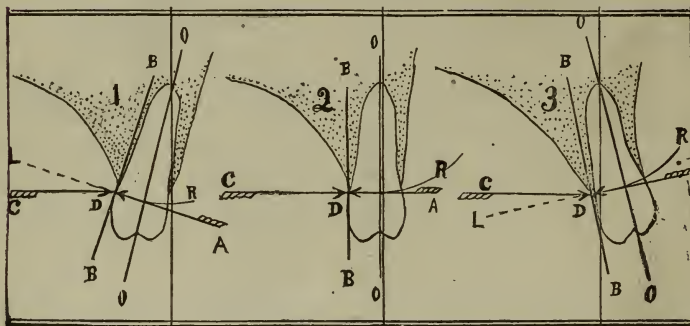
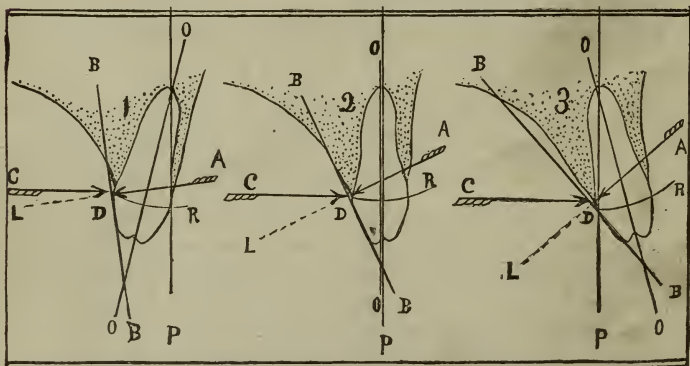


FIG. 94.

FIG. 95.

FIG. 96.



by Diagrams 1, 2, 3, three corresponding positions of three different shapes of teeth.

By understanding what has been said respecting Fig. 82, the truth of proposition second becomes so self-evident, from a comparison of these three sets of figures, that it needs but little further demonstration. It is also obvious that, although the plane of tooth- and socket-resistance (RD), in the matter of raising or depressing teeth in their sockets, is worthy of consideration, it is not of so great importance in making calculations for the retention of mechanical appliances, as is the direction or inclination of the lingual surface-plane (BB) of the tooth in relation to the plane of applied force (CD), and that it matters little which side of the line AD lies the line RD, whether above, as shown in Fig. 88, or below, as shown in Fig. 96: for devices depending upon unaided impingement are not much influenced by it.

While duration of the usefulness of such devices depends much upon the position of the teeth in the alveolar ridge, quite as much, it will be seen from an examination of these nine figures, depends upon the difference in the shapes of crowns and necks, for this also determines the inclination of the surface-plane; and while the bell-shaped crown of Figs. 88, 89, 90 is most advantageous, that of the tapering (or gilly-flower apple) shape, Figs. 94, 95, 96 is the least, and that of nearly cylindrical shape, Figs. 91, 92, 93 is medium between the other extremes. Thus it will be seen that these adverse conditions of position and shape, often found, either before or during some stage of the process of widening the arch, present many difficulties which necessitate the binding of the mechanisms to the teeth in order to prevent them from slipping off.

How this may be done, will be considered in the next number.

(To be continued.)

## PROCEEDINGS OF DENTAL SOCIETIES.

### NEW YORK ODONTOLOGICAL SOCIETY.

REGULAR meeting held at the residence of Dr. S. G. Perry, Tuesday evening, February 15, 1881.

President Dr. W. A. Bronson in the chair.

#### INCIDENTS OF OFFICE PRACTICE.

Dr. C. M. Richmond. I wish to call your attention to the advantage of a gold-pointed instrument as an amalgam carrier. With it amalgam can be picked up in large or small pieces and carried to any part of a cavity with perfect ease. Those who use amalgam will find it of great service.

Dr. C. E. Francis. I have a communication from Dr. H. C. Quimby, of Liverpool, England, containing a description of two interesting cases, which he presents to the society. He writes:



"I have pleasure in sending two of my most interesting specimens for examination by the members of the Society, with a brief history of each case.

"1st. A salivary calculus, taken from the duct of Steno, in the mouth of an old woman of about sixty-five years of age, at a public dispensary, where I used to attend two or three times a week to see dental cases for the very poor.

"The old woman said she had a tumor in her cheek that had been growing a long time, but had never given her any pain. On looking into the mouth a molar tooth appeared to be adherent to and held in position by the cheek, the alveolus having quite disappeared. I easily removed the whole mass with my fingers,—tooth and all,—but I am sorry to say the tooth was carelessly lost by one of the young men who washed it. The duct appeared to have enlarged sufficiently to make room for the calculus, while a comparatively contracted orifice prevented its escape.

"2d. A central incisor, which has a curious history. When the young lady from whose mouth this tooth was taken was about eight years old, she was thrown from a carriage upon a hard road, and this tooth was knocked out. The child was taken home, and a surgeon was sent for. As it was a country place, all this took time, so that when the surgeon inquired for the missing tooth some hours had elapsed. No one had thought of looking for it, but the surgeon went to the scene of the accident, found the tooth on the dusty road, washed it carefully, and replaced it in its socket.

"I saw the case for the first time three years after this occurred, and then, and for several years after, during which time I frequently saw the mouth, I could not detect any discoloration or opacity, or any other indication to justify me in drilling into the tooth; for, although I never supposed it could have a living pulp, I wished to give it the benefit of the doubt. But when the young lady was about fifteen years old, the dark, opaque spot that indicates a devitalized pulp appeared, and I at once drilled into the tooth, removed all the discolored matter, treated it in the ordinary way through the pulp-canal until the suppuration ceased, and then filled it, not having at any time a suspicion that there had been any absorption of the root; and I do not think any absorption had taken place at that time, for one would be able to feel if the apical foramen were unusually large, or the root unusually short, with more certainty in a central incisor than in any other tooth.

"After filling, the tooth went on comfortably for about four years, and then it began to be painful, and the lady, who had in the meantime gone to reside in a distant city, came back to me for treatment. I removed the filling, and dismissed my patient as soon as I

could see the blood and pus flowing through the canal, making an appointment for beginning a course of dressings as soon as I thought the swelling and soreness would have subsided,—that is, in about a week. On this occasion, about two-thirds of the way up the root my probe came in contact with a fleshy substance, which I took to be the not unusual form of polypus that we find developing through the apical foramen into the pulp-canal, but being unable to extirpate this, and the tooth not tolerating any dressing that did not permit free drainage, I finally inserted a piece of gold tube, packing carefully around it with gutta-percha, and it remained thus for about two years, when, as the tooth had never been quite easy, and was at times quite painful, I extracted it, and found that, as you see, nearly the whole of the root had been absorbed."

Dr. A. H. Brockway. I received yesterday, from Dr. J. Edward Line, of Rochester, a set of improved file-carriers, which I exhibit at his request. As will be seen, their peculiarity consists of a slit at the end of each, in which a separating-file is placed, the file being firmly held by shellac. The best parts of broken files may also be utilized. They are of different shapes, for use in different parts of the mouth.

Dr. S. G. Perry. For many years I have attained the same results by fastening broken separating-files to instruments or handles of different shapes, with soft solder. The heat required in soldering them is not sufficient to draw the temper of the working part of the file, and a rather neater finish is given than by the shellac fastening of Dr. Line. I make very useful file-carriers of my old mouth-glass handles, as well as of strong used-up excavators. For solder I use a bit snipped from an old britannia impression-cup, and for a flux a drop of chloride of zinc.

The secretary read a paper from Dr. Truman W. Brophy, of Chicago, on "The Position that Dental and Oral Surgery is Destined to Occupy in America." \*

#### *Discussion.*

Dr. E. A. Bogue. I suppose the members of the society are aware that the International Medical Society has appointed or made room for a Dental Section? The association will meet in London the coming August.

Dr. C. D. Cook. The association has not only made room, but has organized, and sent notice to the dental profession throughout the world, I suppose. The call is made through the English journals.

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\* Dr. Brophy's paper appeared in the DENTAL COSMOS for March, 1881.

Dr. F. Y. Clarke then read the following paper on "Bacteria."

In this paper, owing to lack of time, we cannot attempt a microscopical illustration or much of a description of the almost innumerable germs found to exist in and about us. Beale, Cohn, Wythe, Dujardin, and others have written volumes and spent the best part of their lives to accomplish this, and to micologists it seems as though they have no more than initiated the task.

In microscopic medicine the germ theory of disease is now attracting more attention in this country than ever before, and investigators here bid fair to catch up with and outstrip the trans-Atlantic workers, who have heretofore taken the lead. Huxley, Beale, Tyndall, and others are fighting over metamorphosis, abiogenesis, or biology, while we Americans take a more practical view, and are anxious to learn what can be learned from bacteria or bioplasm.

Years ago, when commencing the investigation of this subject, we need not tell you we mistook hair, cotton-fiber, dust, saliva-bubbles, and oil-globules for infusoria, rhizopods, monads, and all sorts of germs; and after showing these supposed monsters to many of our patients, and discovering mistake after mistake, we took a rest, and after a year or two began again, this time with more care, becoming familiar as possible with unorganized matters found in the mouth and about the teeth, such as epithelium, mucus, particles of food, etc. From low powers, and low organic and inorganic matter, we have worked our way to the highest objectives.

An accurate knowledge of chemistry is absolutely necessary in the preparation of specimens and detection of life-germs from inorganic matter or plasm. When we fail to clearly demonstrate and classify disease- and health-germs through microscopical and chemical examination, then we are fully justified in proving their existence and defining their species by circumstantial evidence.

We know that within and about us nothing is inactive; everything is undergoing change. When and where matter of any kind ceases to exist it becomes pabulum for other matter. With the vegetable world as with the animal, the fight goes on from life to death, and from death to life. Now and then the gigantic oak, as well as the tiny bud, is overcome by the parasite or death-germ, and has to succumb and undergo the process of decomposition to supply nutrient matter for hungry successors. Thus we see, at times, our fruit- and forest-trees attacked, and in certain sections almost exterminated, by devouring and poisonous germs invisible to the naked eye. It is a well-established fact that parasites or bacteria cannot remain on living vegetable matter without harm; they are invariably productive of disease or death. Trees, plants,—every shrub that



grows,—attacked by disease-germs and parasites, are in an abnormal state; and so, also, are the organs of man when similarly invaded.

We may see in every-day practice, on wounds in and about the mouth, a clear, colorless liquid spreading over and protecting the wounded part. This is bioplasm,—the organ- and tissue-builder, and repairer of all animal and vegetable life. *Bio*, life; *plasma*, substance: life-substance,—a word introduced by Huxley, and adopted by Beale in describing minute germinal matter. In this bioplasm is cell-matter, that constructs enamel, dentine, nerve, vein, artery, and every tissue of life. These cells, if undisturbed, work in harmony, carrying, in due time, to each organ and tissue that which is essential to construct a perfect whole. If the enamel- or any other cell-plasm is disturbed or invaded by bacteria, then comes derangement.

If a mother is suffering from syphilis, small-pox, serofula, or any other germ disease, the bioplasm forming the organs of the fœtus are invaded by disease-germs that characterize each disease. The result is a child well-marked, who grows up, marries, and dies, leaving his marks as monuments behind. These marks are often on the teeth, and have become quite familiar to all who have given the subject any attention. The dentine of which the teeth are mostly composed has minute tubes which radiate from center to surface. These tubes are filled with bioplasm. This comparatively unknown bioplasm, spoken of by Beale in his first works as germinal matter, is now generally considered as the life-giving, life-saving, wound-dressing, bone- and tissue-repairing agent of all that is. In the treatment of every wound, bone, tooth, or tissue, we should coax, encourage, and protect the working of this heretofore unknown god in every way available, if we wish to be successful in our operations. Shave or wound a pulp, and with a good magnifying-glass, after due bleeding, bioplasm will be seen spreading over and protecting the injured part, and what is more wonderful, this bioplasm, although the same in appearance, is different in action from that which spreads over a wounded muscle; it is that which is wanted for repairing bone and nerve. We believe that in almost every case where a pulp is in a normal condition, by skillfully removing all projecting and ragged edges, even if to accomplish this a portion of the pulp itself has to be removed, and then thoroughly protecting and encouraging the action of bioplasm, new walls can, under favorable circumstances, be produced. We have a patient residing in this city who has a cuspid that was broken off midway by the kick of a horse some ten or twelve years ago; at the time he was advised by his dentist to have the broken parts removed. We saw this tooth

a few years after the accident, and again the other day, and although the fracture can be easily located, the tooth is apparently in a healthy condition, with a live, healthy pulp, and no discoloration. This patient resides conveniently on Madison Avenue, and can be seen by any interested.

You all know the most frequent locality of caries is on the coronal surfaces of the molars and bicuspid. The next in order are the approximal surfaces, then the buccal. From this we argue that, owing to the continual brushing of the tongue and the naturally smooth surface of the lingual sides, the destructive agents secure no lodgment or place of attack there, consequently caries cannot take place. On the grinding surfaces of the molars and bicuspid are pits and fissures, or laboratories, within which the destructive agents are generated and from which they make their attack.

The bacteria of the mouth, says our microscopic dictionary, form some of the most minute germs the micologist is called upon to examine, and it is with the greatest difficulty that their structure can be made out; but, although in the ordinary way of examination, structure is invisible, yet, by allowing them to dry spontaneously on a slide, or adding a solution of carmine to them in the wet state, it can be clearly seen that they are composed of minute colorless joints. When treated with potash, they are not acted upon, although the minute monads with which they are invariably accompanied, are bursted and dissolved; nor have we succeeded in coloring them by Pettenkop's test, although their size is so minute that the magnifying power used to render them visible would so dilute the color by diffusing it over a large surface that it is difficult to speak positively upon the point. They are propagated by the formation of new joints and subsequent separation at one of the articulations. They are almost invariably the first organisms found in decaying and putrefying matters,—especially animal. When treated with iodine, and then sulphuric acid, their jointed structure is very distinct, and it appears that they are composed of two parts: an outer portion, which seems pale or slightly colored, and an inner, which becomes very dark; but the tints cannot be distinguished with certainty.

Cohn, in his able work on this subject, says, bacteria are non-chlorophyll cells, globular, round, oval, cylindrical, or twisted, which multiply by fission, and which vegetate either singly or in groups. Their coloring is due to pigments in the protoplasm. The bacteria which produce red, yellow, orange, blue, and other pigments, may hardly be told apart, yet plant them, and they will always give the same pigments.

That bacteria have a cell-membrane, is proved by their behavior

when exposed to chemical re-agents. They are not disturbed by potash, ammonia, or acids. This is attributable, not to the free and exposed condition of the protoplasm, but to the cell-membrane. In like manner, this cell-membrane resists putrefaction for an extraordinary length of time. That bacteria are the true cause of fermentation, febrile action, and putrefaction, micologists have no doubt, as they are ever present when and wherever one or the other is going on,—one tribe following another as the ferment changes, and sometimes so rapidly that they become food for each other.

From time to time, within the last ten years, we have filled teeth in the mouths of different persons, under dissimilar conditions, to learn how far, if at all, carious dentine was infectious. The first case was in 1871. Two cavities were made in one tooth. Within No. 1 a layer of carious dentine was placed, taken from a carious tooth in the same mouth, and the cavity was then filled with usual care. In No. 2 a similar layer—after saturating it in carbolic acid—was placed and the cavity filled as was done with No. 1. At the end of six months there was no apparent change; after eighteen months a blue tinge was quite perceptible around filling No. 1; and at the end of two years it had to be removed to save the tooth.

In another case, the cavity, after the caries was removed from around the edges, leaving a deep bottom layer of decay which was saturated with carbolic acid twenty-four hours, was filled with gold. This was over six years ago, and the filling as yet gives no indication of change. In a third case, three teeth were filled over deep-seated caries, making good edges, but using no disinfectants, and the fillings had to be renewed within a year, as evidence of further decay was positive.

If we want further proof as to the action of disinfectants on infectious dentine, we have it in the mouths of tobacco-chewers, and better illustrated in our old-fashioned amalgam fillings.

When beginning practice, we thought, as have many others, that it was our duty to replace amalgam with gold, and we were often puzzled by finding the cavity-walls, although black, in comparatively good condition.

In our own mouth is a large amalgam filling inserted over thirty years ago, when we were so situated that we could not have it properly filled with gold. This filling is on the posterior surface of the second right inferior bicuspid, and is doing as good service to-day, as any of twenty other gold ones. Now do not understand us as saying that we consider amalgam better or as good as gold, for such is not the fact. There are exceptional cases, as in our own mouth, and we cannot, until we know just when, how, and where, to use it, depend on it as on a good gold filling. In all modern amal-



gams we have been doing our best to get rid of the saving ingredient, the mercury, which acts on the bacteria of carious dentine, and under favorable circumstances, brings about calcification of the cavity-walls.

In conclusion, we think you will agree with us in saying that it is impossible for acids to bring about all the various changes witnessed in caries, and thus we have strong circumstantial reasons, independent of the direct evidence of microscopy, for asserting that these changes are brought about mostly, if not altogether, by bacteria.

We wish to be understood as saying, that caries arises from different ferments or sets of bacteria, produced from air-germs, or, as Beale has it, by diseased bioplasm, which has its origin within man himself; that these organisms must have some pit, fissure, interstice, or unmolested surface; that in all such locations, there is a whitish or brownish, cheesy substance, which, under the microscope, is what is known as leptothrix, and which is infectious, as is proved by the experiments cited, and by the action of mercury and nicotine; and that when advisable, carious dentine can be disinfected and converted into a natural and better protection for the pulp than any other substitute.

#### *Discussion.*

Dr. Frank Abbott. It has been my fortune, within the last three or four years, to examine a great many teeth; not only carious teeth, but also those in a comparatively good condition. In the paper which I read before this society a little over two years ago, upon "Caries of Human Teeth," I stated very positively, and I am ready to reiterate the statement now, that what Dr. Clarke terms bacteria, leptothrix, or micrococci, are found in the mouth in tartar, in decomposing food, and upon the teeth.

Dr. Clarke. I have not stated that leptothrix, bacteria, or micrococci are the same. I call them distinct.

Dr. Abbott. I understand that. You might see millions of micrococci in one specimen, but bacteria proper are not found in decaying teeth, that is, in the decayed substance itself. They are found in the food, and about the teeth. Leptothrix are also found in large quantities in decaying teeth, but it has never been shown in this country (and I believe we have made as careful examinations as have been made anywhere) that these organisms play any part in the decay of the teeth. They are simply organisms which present themselves in large numbers and thrive as soon as decomposition of the tooth-substance begins. In ulceration of the mucous membrane of the mouth, you find the same thing. I think I have shown very conclusively that decay of the teeth first begins by a dissolution of the lime-salts by an acid, and the moment the living matter in the tooth

is exposed, there is an irritation set up which penetrates the tooth-structure, sometimes to, and even beyond, the pulp itself, when only a very small portion of the tooth is destroyed. The doctor speaks of the solidification of the tubuli; that is the same theory advanced by Tomes years ago. He evidently mistakes a partial decalcification for solidification. Under a low power all specimens of carious teeth present that appearance. On the other hand, if you raise the power, and have your specimens thin enough, you observe that these conditions are the various stages of decalcification and absolute inflammatory reaction. No leptothrix or micrococci are found, excepting where decomposition of the tissue has commenced. The acid condition that exists at the bottom of a cavity, where the partially-decalcified tooth-substance is necessarily left in many cases before filling, can be neutralized by coating that portion of the cavity with precipitated chalk. It may be used either dry, or mixed with creasote; if used with creasote, the antiseptic effect of that substance is also obtained, which possibly may be desirable. To Dr. C. E. Francis, of this city, is due the credit of suggesting the use of chalk for this purpose. I have used it a great many times with happy results. As far as the mercury in amalgam is concerned, I should rather doubt the possibility of its having much effect one way or the other. If a tooth is hermetically sealed by the filling, the partially-decalcified portion becomes recalcified,—so much so, that often that portion of the tooth appears to contain more lime-salts than even normal dentine. This process of recalcification sometimes takes place where no filling has been done; decalcification stops, the inflammatory process subsides, and a re-deposition of lime-salts takes place.

Dr. Clarke. I feel too deeply interested in this subject to let pass what has just been said without a word or two in refutation. For many years I have given this matter considerable attention and investigation, and I can assert most positively that the chemical or lime-and-acid theory is incorrect. Beale, Huxley, Tyndall, and Cohn are authority as to bioplasm and diseased germs. They have most positively proved that nearly every disease that flesh is heir to is caused by bacteria or diseased bioplasm. It is folly to say that these eminent observers are deluded simply because one cannot in a few hours, through a pocket- or ordinary microscope, see all that has been described by them. According to this there would be no contagion or infection, and we could breathe infected air and handle infected matter with impunity. The lime-and-acid theory—to the uninitiated—in some respects is very pretty and plausible, but in practice is a failure. If it is correct in theory, that caries is produced by an acid, why not act upon it in practice, and neutralize the acid

with an alkali? In cases where there is danger of pulp-exposure, why not free the carious dentine with chalk, as you say you can, and leave the layer of decay as a capping? You know by experience that it will not do. You would lose your teeth and practice too. This has been often tried long ago, and found of no apparent value. How is it that teeth decay in mouths where no trace of acid is found, but where the fluids are alkaline? Does that which prevents, initiate decay? Again, if decay is caused by an acid in the saliva, why are not all surfaces attacked alike? Fermentation must, and does, take place in all pits, fissures, uneven and unmolested localities, and thus bacteria are developed. It is true that the acids thus generated may, to some extent, attack the lime of the tooth, but that it is the real cause of caries, most emphatically, *no!* As stated in my paper, it is impossible to account for all the different shades of caries on the acid theory. Acid does not and cannot produce them.

Dr. Abbott. There is probably not a man within hearing of my voice who will state that he removes all abnormal tooth-structure from teeth before he fills them, under all circumstances. If he does, he has a good time of it, and his patients are to be pitied. There is not one tooth in ten that is filled where this is done. All traces of decay are probably not removed from any of them. There possibly may be exceptions. I have seen traces of decay penetrating to and even beyond the pulp-chamber, where the cavity proper was not half the size of a pin's head. You must stop your excavations somewhere, and it is usually short of removing all abnormal tooth-substance. I know I do. I know every other man does who has the health and comfort of his patients at heart. The partially-decalcified portion usually left under fillings presents, under the microscope, that peculiar yellow stain imparted to organic material by chromic acid, showing very plainly that the glue-giving basis-substance has become liquefied, and the lime-salts dislodged. Under low powers the specimen presents a granular appearance, but high powers show the inflammatory condition of the living matter.

Dr. Clarke. Do you leave the caries in the tooth?

Dr. Abbott. Every one, probably, that I fill, if you call partial decalcification caries.

Dr. Clarke. Do you not pretend to take out all caries?

Dr. Abbott. I take out enough,—probably as much as any one. I have been filling teeth twenty odd years, and I pretend to know how it should be done.

Dr. Clarke. Do you take out every particle you can?

Dr. Abbott. Yes, sir, without danger of exposing the pulps.

Dr. Bogue. I would like to ask Dr. Abbott in what manner he marks the decay?



Dr. Abbott. If I made that statement, it was not exactly the language I intended to use. Destruction of a tooth to the extent of a thirty-second of an inch in depth will often show a peculiar stain to, and sometimes beyond, the pulp-chamber. Those are the marks of the beginning of the destruction of the tooth, which are plainly seen, and will surely proceed to decomposition unless arrested.

Dr. Bogue. Lest we misunderstand Dr. Abbott, I venture to ask the question whether he means discoloration? We do not remove it always, nor do we try to. If he means vitrification, I suppose we do not remove it or try to.

Dr. Abbott. I do not recognize any such condition as vitrification; it is recalcification of decalcified dentine.

Dr. Bogue. The surface which I now refer to is harder than the dentine originally was.

Dr. Abbott. Those are exceptional cases, and the condition is due to a more excessive deposit of lime-salts than dentine normally contains.

Dr. Bogue. You find no decay upon dentine which may not be accompanied by greater density of dentinal tubuli. This is nature's barrier against the caries attacking the pulp-chamber.

Dr. Abbott. When the inflammation subsides, solution of the glue-giving basis-substance ceases, and recalcification begins; when completed, the appearance is presented of more solid dentine.

Dr. Bogue. When this greater density is overcome, then decay penetrates to the pulp-chamber with great rapidity, but, in the earlier stages of the decay, the decay is antagonized by the filling up of the dentinal tubuli.

Dr. Perry. In every instance, do you state?

Dr. Bogue. No, sir; I do not know as much as that. I simply imagined that Dr. Abbott and Dr. Clarke were looking at different sides of the same shield.

Dr. Bödecker. I have been cutting and examining a great many teeth, both normal and decayed, but a recalcification of the dentine. I have only seen twice. I have two specimens, and I believe these are the only two that have been seen in Dr. Heitzmann's laboratory. I regard them as exceptional cases. If it were not so, Dr. Abbott, as well as I, would have seen more of them. In one of the two specimens, which was cut from the neck of a tooth, I remember distinctly no decay was perceptible. The neck of a tooth is quite characteristic, showing spindle-shaped protoplasmic bodies in the cementum, with the canaliculi of the dentine stopping short of the latter. These spindles had disappeared, and instead of them recalcified dentine was present. That this dentine is a secondary formation, I am sure, because primary dentine and cementum exhibit a

different appearance from recalcified dentine or cementum. The number of dentinal canaliculi is much less than in normal dentine; they are generally wavy and irregular, and the basis-substance looks entirely different from that in primary structure. With regard to the germ theory, I believe we are somewhat in the dark yet. An eminent writer of Europe, whose name I have forgotten, quite recently has published extraordinary statements. He has observed leptothrix flourishing upon crystals of carbolic acid. He is opposed to Lister, who some years ago adopted the use of an aqueous solution of carbolic acid in the form of a spray, for surgical operations. Great wonders have been done by its use, and yet some surgeons to-day say, that the beneficial result is not to be attributed so much to the use of Lister's spray, as to cleanliness. This is a thing not at all settled. I have been for over six years in the habit of disinfecting every cavity, previous to filling, with a solution of carbolic acid. If it is far enough from the pulp, I take the crystals; but if it is near the pulp, I use about a five to ten per cent. solution in water, for it is dangerous to bring the concentrated carbolic acid near the pulp when exposed.

Dr. Clarke. I know the writer of whom you speak never saw leptothrix on carbolic acid, unless on the pure crystals at a low temperature. They cannot exist on carbolic acid in a fluid state.

Dr. Bödecker. Carbolic acid has played a very important part in this connection, but we do not know whether it is carbolic acid or cleanliness.

Dr. Bogue. For my information, let me ask Dr. Bödecker his meaning. He spoke of secondary dentine, but did he mean a secondary deposit in the dentinal tubuli? Did I understand that was seen but twice?

Dr. Bödecker. Yes, sir; once in a cavity that had decayed, and once in the neck of a tooth where there had been no previous decay whatever.

Dr. Bogue. Of course you have examined teeth that have been worn off by tobacco-chewing. Has it not been seen in those cases?

Dr. Bödecker. I have not seen many of them. They generally presented a discoloration, but no recalcification.

Dr. Bogue. I am greatly surprised and interested, and I do not undertake at this moment to combat the testimony. The filing that was once so freely done, certainly produced a changed appearance of the surface, and the teeth which underwent that process presented a very different appearance a few years later. To all appearance, some of them are as polished as if they had been carefully polished at the time. I have in mind a lady whose dentist cut out the lower molar cavities; she has entreated me to fill them, but I

have declined. There is no decay to be seen, and those places, while dark, are polished and bright.

Dr. Abbott. Cleanliness is the secret.

Dr. Bogue. I have no doubt of it, but I supposed, and I shall be astonished if it is not so, that the dentinal tubuli were filled up by a deposit of lime-salts.

Dr. Abbott. That possibly may be the case, but I am of the opinion that it is recalcification after partial decalcification, and that the structure of that portion of the tooth is changed very much from its original condition, *i.e.*, it shows a secondary formation of dentine.

Dr. J. W. Clowes. The philosophers of this country and Europe have been very busy of late in straining their eyes to discover, per microscope, the ossivorous bacteria and festive leptothrix. Of course they have been found and their habits noted, and now we are told a cock-eyed fellow of browsing proclivities has appeared upon the scene and is vigorously disposing of the dentinal herbage, and making a brave struggle for existence. What are we coming to, if this raiding upon personal property is not stopped? Not a tooth will be left us if these imps of destruction are not muzzled and a check placed upon their rapacity. I have diligently searched for the leptothrix, and hoped to find him in his moments of festivity, but, blister my eyes as I may, the effort thus far has been fruitless. The aforesaid philosophers have amused themselves vastly, and their enjoyment has been full. Seeing by faith alone, we have partaken of their joys until we are full also, and as common-sense professionals, are tired of amusement. *We are sickened by the nonsense which attributes dental decay to the action of microscopic tigers and wolves.*

The cause of decay has long been understood; it is no secret to those of sense possessed, and is *shown by the simple chemical experiment of immersing an egg in vinegar.* This will tell the whole story. Did you ever try this experiment? Do so, and you will, in a few hours, ask what has become of the *lime that was in the shell?* *The acid of the vinegar has dissolved it, and nothing but its cartilaginous portion remains.* Dental decay is the dissolution of lime-salts by the presence of an acid, and the progress of decay is according to the measure of its strength.

Dr. Clarke. The *germs* of the vinegar produced the change.

Dr. Clowes. If the *wigglers* inhabiting that acetic territory are equal to that, their teeth are better than ours.

Dr. Abbott. You have the egg left after the action upon the lime-salts?

Dr. Clowes. The egg still remains; the lime only has been dis-



closed and is held in suspension by the vinegar. I declared to this society years ago *that teeth are but organized lumps of lime, and acids are their affinity and their solvent.* This is the whole story in brief: Whenever an acid comes in contact with a lime body, the affinities are such that the lime succumbs to the acid. You may look through all the woods, ravines, and mountain ranges of the dental continents, and these severely-hunted animals will be found entirely harmless and non-destructive, *living, moving, and having their being because of favoring conditions, and not producing these conditions.* Dr. Abbott says acid-effects are arrested by prepared chalk; this is because chalk is antacid. It neutralizes the cause of decay, and decay must then stop. Chalk is a great preservative to place around and among the teeth. Without prepared chalk, no tooth-powder would be of any real value. Our friend wishes to know how decaying teeth were saved by filing, and in what way the processes of decay were arrested. *When in contact, the teeth caught and retained foreign matter, which, when acidified, produced decay; when separated properly, the retention of said matter ceased, and the cause of decay passed away by a healthful disturbance in the act of eating.* Separating skillfully always arrests decay, and, if done early enough, entirely prevents it.

Dr. Clarke. If, as has been stated by Dr. Clowes, the teeth are nothing more than lumps of lime, then the fluids of the mouth would dissolve them as rapidly as water dissolves lumps of lime out of the mouth. His so-called "browser," or "cock-eye," would have no time for hunting about through dental ravines, woods and mountains. Whole sets of teeth would be eaten up and demolished in one general assault. You are advised to try the old egg-shell experiment by placing an egg in vinegar; place with it a decayed tooth, and see if you can produce the same changes which are produced in the mouth.

Dr. Clowes. Decay, when produced by a direct or highly acute acid, is very white; the enamel and dentine are not only softened but bleached by it, and its progress is very rapid. Decay, from dilute acids or the gradual decomposition of food, at first has no color, but assumes a brownish tinge as each successive layer of softened bone is exposed to the air. *We understand this very well; we should be very obtuse, intellectually, if we did not.*

Dr. Abbott. In reference to the pigmentation the doctor speaks of, it will be remembered that in my paper, before referred to, I spoke very particularly of the discoloration of decaying teeth, and stated that those teeth which decayed very slowly indeed, were those which were discolored the most. "The slower the decay the more the discoloration; the more rapid the decay the less the discoloration." Where this pigment comes from we do not pretend to

say, but that it is contained in the organic substance of the tooth there can, in my opinion, be no question, from the fact that the lime-salts could not contain it, and furthermore, you may dissolve the lime-salts entirely out and have the discoloration still remaining.

Adjourned.

### SIXTH DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

At the annual meeting of the Sixth District Dental Society of the State of New York, held at Binghamton, May 5, 1881, the following officers were elected:

*President.*—L. E. Ireland, Oneonta.

*Vice-President.*—E. S. Walker, Greene.

*Recording and Corresponding Secretary.*—A. J. Wright, Owego.

*Treasurer.*—F. B. Darby, Elmira.

*Censors.*—A. M. Holmes, F. B. Darby, H. Hodge.

*Delegates to State Society.*—L. E. Ireland, A. M. Holmes.

*Committee on Semi-Annual.*—L. E. Ireland, A. J. Wright, G. H. Smith.

The Fifth District Society will hold a Union Meeting with us at Courtland, beginning Thursday, October 6, 1881.

A. J. WRIGHT, D.D.S., *Secretary.*

### PENNSYLVANIA STATE DENTAL SOCIETY.

THE Executive Committee for 1881 call attention to the fact that the next meeting of the Pennsylvania State Dental Society will convene the last Tuesday of July, at Chautauqua Lake, a delightful, popular, and accessible summer resort.

Special hotel rates will make it an object for members to bring their wives and friends, and these rates will continue during the season, or such part thereof as they may choose to remain.

W. E. MAGILL, *Chairman Executive Committee.*

### PENNSYLVANIA STATE DENTAL EXAMINING BOARD.

THE Pennsylvania State Dental Examining Board will hold its annual meeting for the examination of applicants, at Chautauqua Lake, N. Y., during the session of the Pennsylvania State Dental Society, which convenes Tuesday, July 26, 1881.

Applicants will be required to show specimens of work in both the operative and mechanical departments.

C. N. PEIRCE, *Chairman.*

**CENTRAL DENTAL ASSOCIATION OF NORTHERN NEW JERSEY.**

At the regular monthly meeting of the above association, held at the office of Dr. G. C. Brown, Elizabeth, April 28, 1881, the committee appointed at the previous meeting to consider the suggestions offered in the president's address at the last meeting, reported favorably on all the suggestions, and especially that referring to the appointment of a committee of members to inaugurate dental infirmaries in Newark, Elizabeth, and Jersey City. The report was accepted, and committees appointed for the cities named. The recommendation for the inauguration of a system similar to that of the Pharmaceutical Association, of sending questions to members, the answers to be read before the association, was also adopted.

G. CARLETON BROWN, *Secretary*.

**ALABAMA DENTAL ASSOCIATION.**

THE next annual meeting of the Alabama Dental Association will be held in Selma, Alabama, July 19, 1881.

The State Board of Dental Examiners will meet at the same time and place. Every dentist in the State is expected to be present, as under the late act of the legislature every one practicing in the State is compelled to have a license from this board. All dentists are cordially invited to be present.

T. M. ALLEN, *Recording Secretary*.

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**EDITORIAL.**

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**ORAL SURGERY SECTION IN THE AMERICAN MEDICAL ASSOCIATION.**

At the session of the American Medical Association recently held at Richmond, Va., a motion was made by Dr. Gross, of Philadelphia, and seconded by Drs. Sayre, of New York, and Davis, of Chicago, that a section for dentistry be formed in the association, to be called "Section 7—Oral Surgery." The motion was unanimously adopted, and the section will be in working order for the next annual meeting. Dr. D. H. Goodwillie, of New York, was appointed chairman, and Dr. T. W. Brophy, of Chicago, secretary, of the new section. This recognition of the claims of oral surgery to position as one of the specialties of medicine has been long desired by many dental workers. It remains to be seen what advantages will be secured thereby. The opportunity should be intelligently improved.



## BIBLIOGRAPHICAL.

## TRANSACTIONS OF THE OHIO STATE DENTAL SOCIETY FOR 1880.

The transactions of the fifteenth annual meeting of the above society are reported in this pamphlet of seventy-two pages. The essays and discussions are of more than current interest, the subjects of the osseous structure of the teeth, sensitive dentine, and dental education receiving considerable attention. The usual lists of officers and members are given, and the report closes with the laws of Ohio in relation to the practice of dentistry and the administration of anesthetics. Its typographical appearance is fair.

## PROCEEDINGS OF THE NEW JERSEY STATE DENTAL SOCIETY FOR THE YEARS 1878-9-80.

This is a full report of the proceedings of the above society for the years named, and makes an octavo volume of 209 pages. It contains the addresses and essays read before the society, numbering some twenty or more, and covering a wide range of subjects; verbatim reports of the discussions thereon, together with lists of members of the society, officers, etc. The value of the report is enhanced, especially to those practicing in the State by the publication of the law relative to the practice of dentistry in New Jersey, which precedes the proceedings proper. The general "make-up" and appearance are creditable.

## PAMPHLETS RECEIVED:—

Address, delivered before the American Academy of Dental Science, October, 1880. By Joshua Tucker, M.D.

Address, delivered before the American Academy of Dental Science, October, 1880. By C. A. Marvin, D.D.S.

Dentistry and Dental Education: Its Past, Present, and Future, as Related to Medicine. By W. W. Allport, M.D., D.D.S.

Injurious Effects of Vulcanized Rubber. By L. P. Haskell.

Rapid Breathing as a Pain Obtunder in Minor Surgery, Obstetrics, the General Practice of Medicine, and of Dentistry. By W. G. A. Bonwill, D.D.S.

## PERISCOPE.

AMENITIES OF JOURNALISM.—The parable of the camel's discomfiture by the needle's eye may with some safety be applied to the attempt of an editor so to conduct a medical journal as to satisfy everybody. The legend of the old man and his ass is very suggestive of the situation, but not half strong enough, for the old man succumbed after his third attempt, while the editor's experience is a perennial wrestle with the opinions of those who watch

the game. How easy it seems! Not a critic but could play it better. Not one who could not make things go as smoothly and noiselessly as a Jürgensen watch. Let him try it. He will soon find himself thinking of that shrewd magician who, after showing that a little trick with the cards was apparently very simple, said, "It looks easy, doesn't it? Well, practice it sixteen hours a day for eight years, and you'll do it almost as well as I do."

Probably the lookers-on have no idea of the trials with which an editor has to contend; and the impatient critics are commonly those who increase his burdens,—men who feel that he has wronged or snubbed them or is indifferent to them. Their manuscripts have been rejected. "The editor does not know a good thing when he sees it. He is a partisan; one-sided; deals in favoritism; doesn't know how to run a journal; is full of unworthy prejudice, etc." Little they imagine how much less trouble it would cost him to publish everything that comes to hand, and thus please all writers, good and bad. How long would a journal exist if no discrimination, no censorship, were devoted to what is sent for publication? In that case imagine the *olla podrida* it would become! . . .

These are extreme cases of a nature. There are scores of contingencies to decide which calls for serious thought. The editor would not needlessly offend, neither does he like to feel that he is obliged to propitiate anybody. Still, if he would ever have blue skies and pleasant breezes in his sanctum, he must perforce pocket a certain degree of his independence. Thus it happens on occasion that he temporarily widens the meshes of his censor's sieve in order to give passage to an article which is too dull, too stale, or too youthful for the best interests of his journal. All, however, cannot be grain. It would indeed be a remarkable periodical which never contained chaff, for chaff often clings to the very corn itself. . . .

Of the unpunctuated, illegible, ungrammatical, tautological manuscripts; of the unreturned proofs intrusted to the hands of authors for correction; of the individuals who come to give gratuitous and useless advice; of the bores who think the journal cannot move without their counsel; of a thousand other trials and annoyances, nothing need be said. These *impedimenta* form a part of the machinery of every journal. When the reader inclines to criticise a journal, let him first try his own hand at the helm, and he will not long remain ignorant of the rocks and shoals which lie in the way of plain sailing. Let it be remembered, too, that a course which to the uninitiated seems to lead directly away from the object to be attained may be merely the symptom of a head-wind which forces the ship into a zigzag route, even though she be steadily nearing the haven.—*Philadelphia Medical Times*.

THE PRACTICAL BEARINGS OF THE CRANIAL BONES—BONES OF THE FACE.— . . . The *cavity* of the *superior maxillary bone* (the antrum or maxillary sinus) is the frequent seat of disease. Within it may be developed either solid or cystic tumors, and pus not infrequently accumulates. The close relations of the different walls of this cavity to important structures give to these growths more than a passing interest.

If the inner wall becomes expanded, the nostril may be occluded;

if the lower wall, the roof of the mouth may be depressed; while the inferior maxillary nerve, which runs above it, may be pressed upon if the upper wall is affected, and the orbit may furthermore be so encroached upon as to greatly displace the eye. If the posterior wall be crowded backward the zygomatic fossa will be encroached upon, and tumors have thus created a marked swelling in the region of the temple. Finally, the anterior wall may become prominent, and thus greatly distort and disfigure that side of the face.

The walls of the antrum are thicker in the child than in the adult, and for that reason the growth of tumors within that cavity will be liable to progress more rapidly after puberty than before. Suppuration of the antrum arises not infrequently from decay of the teeth, or from a failure to remove a nerve within a tooth after it has been killed by caustics previous to filling a cavity, since the putrefying nerve creates gas, which escapes from the end of the root and thus creates suppuration in and about the alveolar process.

The antrum is the largest of the air-cavities of the head. A large-sized musket-ball has been known to remain loose within it for years, and in some instances such balls have been known to escape through the roof of the mouth.

Drake reports a case where a woman endeavored to explore the cavity of the antrum through a socket of a tooth with a quill pen, and, to her horror, introduced the whole six inches of its length by its assuming a spiral direction within the cavity, and thus curling upon itself. She sought medical assistance, supposing it had entered her brain.

The *antrum* should be tapped in case of its distention from fluid either within the mouth, at a point situated one inch above the margin of the gum, covering the *first molar tooth*, or, that tooth having been drawn, puncture of the antrum should afterwards be made through the socket; or, in case it is deemed important to preserve the teeth, puncture through the canine fossa, as recommended by Desault, or through the molar tuberosity, as recommended by Lémorier, can be performed.

The *nasal bones*, although slight and small in themselves, form an arch of enormous strength, whose buttresses are the superior maxillary bones, and whose center is supported by the spine of the frontal bone. The feats of supporting great weights, such as a ladder with an adult on the top, as seen in the circuses, attest to the strength of this method of construction.

It is for this reason that fractures of the nasal bones are usually associated with a fracture of the perpendicular plate of the ethmoid bone, and occasionally with a fracture at the base of the skull.

The *lower jaw* in man consists of one bone, but in the serpent it consists of two symmetrical bones joined by an elastic band or ligament, which allows them to be separated in a lateral direction to a great extent. It is by means of this arrangement that the serpent is able to swallow its prey, which is often as large or even larger than its own body.

In man, however, this bone is very strong, so as to perform mastication even of hard substances, and its points for muscular attachment are rough and prominent, to afford the firmest possible union between the bone and the power which moves it.



The *absorption of the sockets* (the alveoli), which is natural in the old, constitutes a disease when it occurs in youth or middle life. Such an absorption is liable to occur in cases of long salivation, scurvy, or purpura, and a premature age of the jaws is produced.

When the jaws are closed, we see that *each tooth is opposed by two teeth* in the other jaw, being an evident attempt on the part of nature to render the loss of any one tooth hardly perceptible in the act of mastication.

Each *external cusp* of the lower teeth fits into the hollows between the cusps of the teeth of the upper jaw, and thus insures a more *perfect adaptation* of the grinding surfaces.

The two *condyles*, or articulating surfaces of the lower jaw, are not directed absolutely backward, but are placed at such an angle that, if their long axis were prolonged, they would intersect each other at the anterior edge of the "foramen magnum." This is to facilitate the rotary movements necessary for the mastication of our food.

Each *condyle* of the *lower jaw* can be felt in front of the ear, on motion being attempted. It can be felt to move forward when the mouth is held wide open, and return when the mouth is closed, thus affording the grinding motion demanded during mastication of food.

The *ramus* of the *lower jaw* partially protects the external carotid artery from injury, since the artery enters the parotid gland close to its posterior border.

The *symphysis* of the *lower jaw*, within the mouth, is a guide to divide the genio-hyo-glossus muscle, in case the tongue has to be drawn far out of the mouth to remove tumors of that organ, or in case it is divided as a means of cure for stammering.

The *coronoid process* of the *lower jaw* can be felt at the lateral and posterior part of the mouth. Its inner surface is a guide, in some cases, for puncture of a deep temporal abscess, since pus burrows between it and the tuberosity of the superior maxillary bone.

An attempt has been made to decide as to the character of food indicated by nature for the best nutrition of an animal by the character of his teeth. It does not always hold good, however, as, while man seems adapted to masticate both vegetable and animal food, the bat species have incisors, canines, and molars, and still some are purely frugivorous, while others live entirely on insects. The monkey tribe also have large canines, yet they live exclusively on vegetables.

The *angle* of the *lower jaw* marks a region of special surgical interest, since the temporal, temporo-maxillary, facial, external jugular, and internal jugular veins can be found in the immediate vicinity. Hence the necessity of caution in operating in this vicinity. . . —Ambrose L. Ranney, M.D., in *Medical Record*.

**INJURIES OF THE PALATE.**—So little is said in our surgical works upon the treatment of wounds of the palate, that we are induced to report a few cases occurring in our practice, with a view of directing attention to the treatment.

The first case was that of a little boy some eighteen months of age. The soft palate was completely divided by a knife in the following manner: The child was playing upon the floor, having in its hand a

piece of a dull case-knife. At a time when the end of the knife was in the baby's mouth an older brother in his romplings came in contact with the handle, thus forcing the blade into the baby's mouth. The point entered to the right of the median line, making an incised wound of the soft palate. We were told considerable hemorrhage was present, but this subsided of its own accord. The next morning we approximated the cut edges as best we could by the introduction of one silver-wire suture. This prevented to a great extent the flow of milk and other liquid through the nose when the child attempted to swallow. The wound united kindly; we removed the suture on the fifth day. In about ten days the cure was complete.

The second case was that of a little girl, three years of age. A lacerated wound of the soft palate was made by falling upon a blunt stick, the end of which she held in her mouth at the time of falling. The wound consisted of a ragged and nearly oval aperture just at the anterior portion of the soft palate. As there was no loss of substance and little gaping, we recommended rest of the palate (refrain from talking, laughing, swallowing, etc.), thinking this could eventually effect union, but we afterwards found it necessary to make application of the nitrate of silver to the cut surfaces of the wound in order to complete the closure of the opening.

Some months ago we saw our third case. This was in the person of a negro boy, two and a half years of age. The wound was created by the child falling while having in its mouth the small end of a tin flute, the rim upon which had been removed, thus leaving but one thickness of tin, its edge being rather rough and ragged. In its passage backward and upward the hard palate was slightly injured and the soft palate was torn from its anterior to its posterior extremity—in a ragged and crooked way—when the flute took effect upon the soft structures; a semilunar piece something larger than a half-dime was almost entirely removed. The hemorrhage, to use the language of the parents, was "frightful." The issue of blood was considerable, as we can testify, and was only arrested by the application of astringent lotions. The nature of the injury, the shape of the laceration, necessarily produced a loss of substance and no little gaping. Upon an examination of the parts after cessation of hemorrhage we concluded to close the wound with interrupted suture, an operation much more easily described and recommended than executed. The truth of the last statement was not impressed upon our minds by anything we had read or heard regarding the performance of this operation, but was sensibly realized by our failure to perform the operation as easily and successfully upon the last-mentioned case as we were led to believe might be done. It may be that others, upon meditation and reflection, have thought of the difficulties attending such procedure, but to us upon this occasion it was uncomfortable, notwithstanding the difficulties under which we labored, in properly adjusting one silver wire suture and introducing another, although not so neatly adjusted as it should have been. The introduction of the two sutures did not bring about such coaptation of the torn surfaces as would facilitate union, but the day being dark and bad, the injury bad, the pay bad, and the smell bad, and being somewhat worried, we desisted further efforts and promised to see the boy the following morning. In the meantime we consulted all the works



upon surgery within our reach, and could but express our astonishment that so little had been written upon the subject (many textbooks not even mentioning such an injury), when we take in consideration the frequency with which the accident does certainly occur. The introduction of the sutures recommended is based upon the same principle as in the operation for cleft palate. This occurring to us, we were of the opinion that the adoption of those measures first recommended by Mr. Ferguson and now universally practiced to perfect union of the soft structures in cleft palate, viz., division of the palato-pharyngeal muscles, would bring the wounded parts in this in such relationship to each other as would facilitate union. On the following morning we divided the above-named muscles. The effects were immediately noticeable, the parts relaxing to such an extent as to permit us to tighten the stitches formerly introduced. The wound gradually but kindly united, and in a few days the opening was completely closed. It became necessary, however, to use the nitrate of silver as heretofore mentioned.—*Pinckney French, M.D., in St. Louis Medical and Surgical Journal.*

**ANTISEPTIC TREATMENT OF ALVEOLAR ABSCESS.**—In the August number of the *Monthly Review of Dental Surgery* I published the results of a number of cases of alveolar abscess, and wholly or partially dead roots, that I had succeeded in rendering aseptic by means of injections, or dressings, of eucalyptus oil and iodoform. The results of my endeavors to apply the antiseptic principle to the treatment of these dental disorders went far beyond my most sanguine expectations; the most obstinate and old-standing alveolar abscesses yielded with astonishing rapidity, and I succeeded in preserving roots that, I think, might have been fairly considered as almost hopeless. I am, however, afraid that I failed to make myself sufficiently clear in the article in question, as I have since received a good many letters asking me for further explanation touching certain points in the treatment which I proposed.

Those who have carefully followed the antiseptic theory as practiced and taught at King's College by Professor Lister and Mr. Cheyne, will find no difficulty in believing that, if an inflamed tract can be rendered aseptic or free from, and inaccessible to, germs, that tract will heal; in fact, that it cannot help healing; moreover, if a slough be rendered aseptic, it will not be ejected from the economy by the violent methods of inflammation and suppuration; but, being no longer an irritant, nor in any sense behaving as a foreign body, it will be removed, imperceptibly and gradually, by absorption, and replaced, as imperceptibly, by new and healthy tissue. This will happen as certainly in the case of the dead contents of a pulp-cavity as it will in the case of a slough on the leg or arm, if it can be rendered aseptic. Of course, if the contents of a pulp-cavity be suppurating, and the slough, with its living mass of bacteria, be shut up intact by means of a stopping, an alveolar abscess must ensue; equally certainly, if the bacteria be destroyed and the stopping inserted, the healing process will be accompanied with no disturbance whatever; the only difficulty is to find an agent capable of effecting the destruction of the germs. Carbolic acid would do this; but there are two objections to its use in this situation: 1. If



used too strong, its destructive effects upon the tissues are too great. 2. If used diluted, its effects are too transient. Now, eucalyptus oil and iodoform are antiseptic agents of a much more powerful and permanent kind, and they cause no irritation or destruction whatever of the tissues; these are the considerations which led me to select these agents.

The two points upon which I have not made myself sufficiently clear, are—1. The method of applying the reagents; and 2. The proportions in which I should use them.

With regard to both points, they depend entirely upon the nature of the case. Either may be used alone, or both together, in any proportions most convenient to the case in hand. Where it is necessary to inject, the oil must be used alone. In the case of alveolar abscesses, the best plan is to inject the oil every day with a hypodermic syringe, or any other syringe with a sufficiently small nozzle, the root of the tooth being dressed with wool dipped first in the oil and then in the iodoform. The iodoform will stick to the wool and subsequently dissolve it. There is no need to put any mastic or other protecting material over the dressing, as the oil retains its power for several days when unprotected. In the case of a nerve that is partly dead, the cavity may be dressed with wool dipped first in the oil and then in the iodoform, and applied just as creasote would be, with this difference, that it is quite unnecessary to remove much of the dead tissue. Since the publication of my first article I have had a good many cases confirming my previous results; and my friend, Mr. David Hepburn, has also found the treatment very rapidly successful in the case of a very old-standing and tortuous alveolar abscess that had long been a source of great discomfort to the patient. I am going to try the effect of a composition first suggested by Mr. Watson Cheyne, of King's College, and used by him in the form of bougies for the treatment of gonorrhœa (*British Medical Journal*, July 24, 1880). These bougies are composed of cocoanut butter, iodoform, and eucalyptus oil, and melt at the temperature of the body. I shall cut a small piece off the bougie, and insert it into the pulp-cavity over the dead tissue without any wool, and cover it over with a gutta-percha stopping. This proceeding, if successful, will obviate the presence of the wool, which will, of course, be a great advantage.—*Arthur S. Underwood, M.R.C.S., L.D.S., in British Medical Journal.*

EPITHELIOMA OF THE ANTRUM; PNEUMONIA; DEATH.—R. M—, aged fifty-nine, a shoemaker, was admitted on May 30, 1879. At the beginning of the previous month he had noticed that his right nostril was obstructed; a week or two afterward the lower lid of the right eye became inflamed, and a swelling which commenced here rapidly extended over the right cheek. About this time a painful swelling of the hard palate appeared, and the patient consulted a dentist, who extracted a tooth. Shortly afterward he applied at the hospital. His brother was stated to have died of cancer of the kidney. The other members of his family were, so far as he knew, healthy.

He was a pale but well-nourished and well-preserved man for his age, though he had, he stated, lost flesh latterly. Temperature va-

ried from 99° to 100° F. He complained of a feeling of stuffiness in his jaw, but of no pain.

The skin of the right side of the face was reddened, œdematous, and tender, and the cheek was projected outward by the tumor beneath it. The right eyelids were closed and œdematous, but could be opened slightly, displaying chemosis of the conjunctiva, a clear cornea, and a somewhat sluggish iris. The right nostril was obstructed, and there was a purulent discharge from it; the nasal duct on the right side also appeared to be obstructed, giving rise to overflow of tears. To the touch the tumor gave the idea of a soft-solid rather than of a fluid. Most of the right half of the hard palate was absorbed, a soft elastic swelling occupying the roof of the mouth, the mucous membrane of the latter being congested and swollen. The teeth of the upper jaw were carious or absent, but the alveolar process was neither displaced nor softened. Owing to the resistance of the patient, an examination of the posterior nares could not be made. The lymphatic glands in the posterior triangle of the neck were enlarged, but free from tenderness. The mouth could not be opened to its full extent, and speech was slightly affected. The tongue was broad, pale, and marked by the teeth.

On the 31st a fine trocar with cannula was inserted into the swelling on the roof of the mouth, and a few drops of stinking pus evacuated. The opening made by the trocar was subsequently enlarged, and a drainage-tube was passed into the antrum.

It soon became evident that the growth was malignant, and, as the man's condition became worse daily, removal of the upper jaw offered the only chance of prolonging his life. This was accordingly done on June 4. The floor of the orbit was taken away, but it was impracticable to wholly extirpate the growth in this direction, as the orbital structures were infiltrated. The somewhat free bleeding was restrained by the actual cautery, and the cavity of the wound was stuffed with strips of lint soaked in a strong solution of chloride of zinc.

The growth appeared to have commenced in the antrum, the walls of the latter being partially absorbed, the anterior almost wholly, thereby allowing invasion of the orbit, the mouth, and the pharynx. Several pieces of dead bone, surrounded by offensive pus and débris of broken-down growth, were found in its cavity, thus accounting for the inflammatory condition of the superjacent skin and the purulent discharge from the mouth and nostrils. In other parts the growth was of a yellowish color, translucent, gelatinous, and vascular. Several ordinary soft gelatinous polypi were extracted from the right nostril during the operation.

In sections taken from the margin of the growth near the gum, the microscope showed cylinders of epithelium cells, irregular in form and sinuous in outline, sometimes anastomosing, set in a stroma made up of fibrous tissue and spindle-shaped cells. Epithelium "nests" were observed here and there, but these were few, small, and ill-developed. The papillæ of the mucous membrane covering the gum, where the latter was infiltrated, were hypertrophied. The histological characters of the growth appeared to correspond with those of the "*épithéliôme tubulé*" of Cornil and Ranvier.

On June 13 pneumonia was present at the base of the right lung, and on the following day friction sounds were audible over the



affected area. The edges of the skin wound had united, except at the inner angle of the orbit.

On the 16th there were dullness, extremely weak breath sound, diminished local fremitus, and resonance to the angle of the right scapula, with bronchial respiration above. The lymphatic glands, which had become larger and very tender in the right posterior triangle, had diminished in size after treatment with belladonna and poulticing.

On the 18th the physical signs of pneumonia at the left base became evident, and the general condition of the patient worse, though he wanted to "be up and about." The fetor from the cavity of the wound was now almost intolerable, and one or two sloughs had separated.

From this time the chest symptoms increased in severity, and he died on June 26th.—*University College Hospital Reports, in Lancet.*

**SEROUS CYSTS.**—The president described a somewhat uncommon case of two separate serous cysts, complicated with an alveolar abscess, all in different parts of the superior maxillary bone, and each unconnected with the antrum. The palate on the right side was enlarged, and the first right upper molar, and the right and left upper lateral incisors, had been removed. Over this latter spot were two small openings in the alveolar process, through which flowed a clear serous fluid, very much resembling glycerin. On examining the two incisors it was found that they had both been stopped with gold, and that their roots were more or less diseased; and, at the end of one of them, a dark concretion resembling tartar had been deposited. The molar tooth had a moderately large cavity in it, with the pulp exposed. The patient, aged sixteen, of delicate constitution, applied for advice on account of an alveolar abscess on the right side, near the first upper molar, which had an amalgam stopping; and the symptoms indicated that the stopping was pressing upon the sensitive pulp, as proved to be the case. The stopping was removed, and the pulp treated with arsenious acid with complete success; but the enlargement of the palate still continued, and the tooth was consequently extracted. The antrum was carefully examined, and a probe passed, when it was found, as is frequently the case, that the palatal root had penetrated through the floor; but no discharge of any kind followed, and the parts readily healing supported the diagnosis that no disease existed in the antrum. On pressure of the right side of the palate, the bone was felt to yield, and a glairy fluid passed from an opening in the alveolus above the right upper lateral incisor, and a similar discharge from an opening over the left one; but pressure upon the palate did not increase the flow as on the right side. On the right side, a probe could be freely passed for about an inch upward and downward, and the cyst appeared to lie partly on the external plate of the superior maxilla, and between the plates of the palatine process. On injecting warm water it merely filled the cyst, and could not be forced into the antrum; nor, reversely, would any pass by the opening made in the floor by the palatal root of the first molar. On the left side water was similarly injected, and proved that the cyst was separate from that on the right side, and also un-



connected with the antrum. The patient being about to leave England, his friends wished Sir James Paget's opinion to be taken, who pronounced it to be an extremely rare example of cystic disease, and recommended that the two upper lateral incisors should be extracted, and further treatment deferred until the patient's return. The president did not remember ever having seen a case in which the discharge from the cyst passed by a pulsating movement in jerks, as it did on both sides in this particular instance.—*The Specialist, London, 1881.*

CASES OF NEURALGIA DEPENDENT UPON NON-ERUPTED TEETH.—Mr. Augustus Winterbottom stated that the diagnosis of the true seat of nerve-pain was sometimes attended with extreme difficulty, and often, notwithstanding our utmost endeavors, its real cause remained buried in obscurity. He narrated particulars of three cases of facial neuralgia as bearing upon the subject.—*Case 1.* A young woman, aged twenty-one, consulted him for severe neuralgic paroxysms, affecting principally the left side of the face. On examination, a second bicuspid tooth was found affected with caries, which was extracted. He saw her next twelve months afterwards, looking wretchedly thin and ill; and she stated that she had suffered continuously more or less since the operation. On inspection, a small fistulous opening, situated in the position lately occupied by the second bicuspid was found. On exploration with a probe, the sinus appeared to be about an inch and a quarter in depth, with a substance closely resembling dead bone at the bottom. The sequestrum, however, did not appear movable, but an offensive, thin, sanious fluid could be pressed out from the antrum, which was slightly distended on the affected side. The foreign body not being loose, he determined to attempt its solution by painting the exposed gum-bone with sulphuric acid, while tonics were administered, and change of air recommended. The patient's health did not improve, and an operation was rendered imperative. Under the influence of ether, he introduced into the sinus a long, narrow-bladed pair of forceps, and, after some manipulation, grasped a small, roughened, semi-detached fragment; and was surprised, on withdrawing it, to find what he considered to be the partially developed germ of the second premolar tooth. The wound healed rapidly, and the pain never returned. In this case it seemed probable that periosteal mischief commenced around the root of the decayed second bicuspid, and was from thence transmitted by continuity of tissue to the sac of the non-erupted premolar. That structure once becoming affected with destructive inflammation, the germ within it perished, and became a source of irritation.—*Case 2.* A lady, about forty years of age, complained of severe and almost constant neuralgia, affecting the left upper jaw between the centrals and bicuspid, which commenced three years prior to consulting him; she had then noticed that the left upper central incisor was loose. On examination, the left upper central was found raised in the socket, movable, and the gum congested. The tooth was removed, and the pain subsided. She returned in about eighteen months, having been free from suffering in the interim, but annoyed by a continual discharge of purulent fetid fluid proceeding from a

small fistulous orifice over where the tooth had been extracted. On probing, a piece of exposed and apparently carious bone could be detected, seemingly immovable. This, by the aid of elevators and strong stump-forceps, he eventually succeeded in dislodging, when it was found to be an upper canine, carious, with the pulp-cavity freely exposed. The wound readily healed, and the patient recovered her health.—*The Specialist*.

THE DENTISTS' REGISTER, 1881.—From this volume we learn that there are registered in the United Kingdom 5266 dentists, of whom 565, or 10.74 per cent., are Licentiates in Dentistry; while 4698, or 89.26 per cent., are persons, on their own declarations, in *bona-fide* practice of dentistry. Of those holding college licenses, 348, or 6.61 per cent., are Licentiates (L.D.S.) of R. C. S., Eng.; 15, or 0.29 per cent., of R. C. S., Edin.; 25, or 0.48 per cent., of F. P. S., Glasgow; and 177, or 3.36 per cent., of R. C. S., Ireland. Three foreign dentists are on the Register, two of whom are Doctors of Dental Medicine (D.M.D.) of Harvard, and one Doctor of Dental Surgery (D.D.S.) of Michigan. Dental qualifications only are admitted to the "Dentists' Register," and we are glad to see that very few indeed of the surgeons who practice dental surgery as a specialty appear on this Register, which is no credit to the country.—*The Specialist*.

## HINTS AND QUERIES.

"He that questioneth much shall learn much."—BACON.

CORRESPONDENTS desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

WILL some one please inform me what effect the chewing of turpentine resin has on the teeth? A great many children in my practice are in the habit of using it as chewing-gum, and I find a great many cavities in their teeth. Does the resin promote decay or not?—J. H. E. M.

DOES the combination of morphia with arsenious acid obtund sensibility, and thus lessen the pain when used to devitalize a pulp?—E. B. R.

IF a commercial question is allowable in the department of "Hints and Queries," I would like to ask why dealers decline to send me rhigolene and ether when ordered with other goods?—BRAZIL.

*Answer.*—This question, though foreign to the general objects of this department, is of enough interest to others than the querist to merit an answer in these pages. A solution of the problem may be found in the following extracts from the Revised Statutes of the United States.—EDITOR DENTAL COSMOS.

SECTION 4472. No loose hay, loose cotton, or loose hemp, camphene, nitro-glycerin, naphtha, benzine, benzole, coal-oil, crude or refined petroleum, or other like explosive burning fluids, or like dangerous articles, shall be carried as freight or used as stores on any steamer carrying passengers. \* \* \* \* \*

SECTION 4475. All gunpowder, nitro-glycerin, camphene, naphtha, benzine, benzole, coal-oil, crude or refined petroleum, oil of vitriol, nitric or other chemical acids, oils, or spirits of turpentine, friction-matches, and all other articles of like character, when packed or put up for shipment, shall be securely packed, and put up separately from each other and from all other articles; and the package, box, cask, or other vessel containing the same, shall be distinctly marked on the outside, with the name or description of the article contained therein.

SECTION 4476. Every person who packs or puts up, or causes to be packed or put up, for shipment, any gunpowder, nitro-glycerin, camphene, naphtha, benzine, benzole, coal-oil, crude or refined petroleum, oil of vitriol, nitric or other chemical acids, oil or spirits of turpentine, friction-matches, or other articles of like character otherwise than as directed by the preceding section, or who knowingly ships, or attempts to ship, the same, or delivers the same to any such vessel as stores, unless duly packed and marked, shall be deemed guilty of a misdemeanor, and punished by fine not exceeding two thousand dollars, or imprisonment not exceeding eighteen months, or both, one-half of the fine to go to the informer, and the articles to be liable to seizure and forfeiture.

WILL some one who knows tell me if there is any law relating to the practice of dentistry in Mexico, and if so, the character of it?—ALEXANDER LA GREE.

*Answer.*—We believe there is no national law regulating the practice of dentistry in Mexico. Each State makes its own laws, and these differ. In no State, however, can a dentist practice his profession without license. The mere presentation of a diploma is not sufficient. Permission to practice must be had, either from the Medical Council, where such exists, or from the local authorities. The General Medical Council has power to license for practice, upon examination, in any part of the republic. It also grants a diploma to such as are deemed worthy.—EDITOR DENTAL COSMOS.

REPLY to S. E. T., who asks for the principle of managing a Bunsen burner.

The Bunsen burner is constructed on the same principle as the oxyhydrogen blow-pipe. The latter combines oxygen and hydrogen to produce its effects. In the Bunsen burner the object is to combine carbureted hydrogen,—the ordinary illuminating gas,—with the oxygen of the atmosphere. A certain definite proportion of these gases is necessary to produce the desired results. This requires that certain modifications should be made in the apparatus, according to circumstances. No one device will answer for all cases. The quality and pressure of the gas differs in different cities; the pressure varies in different gasometers, and the amount of oxygen in the atmosphere is not uniform one day with another. The size of the room in which the burner is used; the number of people breathing its atmosphere; the amount of ventilation,—these all, influencing the proportion of oxygen in the atmosphere, are elements to be taken into the account. It is accepted that the proportion of atmospheric air to the carbureted hydrogen should be as eight to one. It follows, then, that the size of the apertures for the admission of air, should vary according to the pressure of the gas as well as the quality of the atmosphere.

It is the mixing of the gases in definite proportions before ignition which determines the character of the flame, whether *blue*, giving heat without light, or yellow, which owes its illuminating property chiefly to carbon. With an excess of carbon, smoke is produced. In the Bunsen burner the flame, fed by the gas, rarefies the air about it, producing a partial vacuum, which the heavier atmosphere rushes to fill, giving up its oxygen, intensifying the heat of the flame, and destroying its illuminating properties. In other words, enough atmospheric air is sucked into the mixing-tube carrying the carbureted hydrogen to insure nearly perfect combustion of the carbon, producing a hot, blue flame, scarcely visible in a bright light, and without smoke. Too much air will blow out the flame; too little air, and the carbon remains to increase the light, to diminish the heat, and to cause smoke. To secure the best results, therefore, the proper relative proportions of air and gas must be preserved, in order to produce the blue flame in which the carbon is consumed. The greater the pressure of gas, the more air will be needed; and this extra quantity is insured, if the apertures for



the admission of air are sufficiently large, by the increased force of the gas-jet drawing the air into the tube and commingling with it. Having the vessel or article to be heated too close upon the flame, is another interference with perfect combustion which is apt to produce smoke.

The gas is likely to take fire at the opening opposite that intended for the admission of air when the supply of gas is reduced, without a corresponding reduction in the proportion of atmospheric air admitted. The lowering of the flame reduces the draft, and allows the gas to escape at the nearest opening instead of at the point where it was intended that combustion should take place.—EDITOR DENTAL COSMOS.

REPLY to Dwight M. Clapp, May number of the DENTAL COSMOS: Whether there is an advantage in "non-cohesive" gold, "wedge-filling," "lateral pressure," etc., or not, depends entirely upon the case in hand. It cannot be disputed that soft or non-cohesive gold foil has a preference over cohesive foil in many respects. In small approximal cavities particularly, soft foil has the advantage in the fact that it will not crumble or "ball" in packing the cavity-walls, and consequently, if properly handled, it will not "draw away" from the walls. In such cavities (approximal) cohesive gold should be used only for *condensing*. I use soft "Globe Foil" for all approximal cavities, simply because it will not ball in manipulating, and consequently tends to a better result. Cohesive foil will not, in my opinion, enter into retaining-pits and under-cuts like soft foil, and therefore will not make an impervious filling. I like cohesive foil for all *contour* work, but for simple "crown" fillings and difficult approximal cavities I use soft gold. I would like to get some practical hints on the subject from some one interested.—F. S. M.

REPLY to J. B. McB., who, in the DENTAL COSMOS for May, 1881, reports a case in which rubber and celluloid plates caused a burning sensation in the mouth.

I have had quite a number of cases similar to the one mentioned—some in which there was a good deal of inflammation—and could only remedy the trouble by using the mineral or porcelain base. There seems to be a special tendency to this trouble from a base of non-conducting property in certain cases.—A. S. RHODES.

IRREGULARITIES OF DENTITION.—At the regular meeting of the Odontological Society of Great Britain, December 1, 1879, Prof. Flower read a paper of much interest upon "Irregularities of Dentition." For some years the same subject has necessarily occupied much of my attention in my special work in oral surgery; and classification of such abnormal cases has aided me much in the foundation of theories explanatory of the causes of such conditions. Within two years I have met with but few cases of fully-developed fourth molars in the upper set without such excess in the lower. In one case—that of my wife—this fourth molar was upon the right side, immediately over the third molar. Its presence was discovered by chronic abscess and necrosed condition of surrounding osseous tissue. Upon extraction of the third molar and removal of the necrosed tissue, the fourth molar, very fully developed, came into proper position. I would say here, that at the time of extraction the first, second, and third molars were all in proper position, as well as a supernumerary tooth having a single root occupying a separate socket between the second and third molars. This case and the four attendant cases are of interest in connection with the remarks of Mr. Mummery at the same meeting, and somewhat subversive of his barbaric theory. Nevertheless, I cannot avoid concurrence with Magitot, Mantegazza, and other stu-

dents in osteology, in the belief in the former existence of a fourth molar in man; nor can I regard as wholly visionary the paper of A. H. Thompson, D.D.S. (in the *DENTAL COSMOS* for May, 1878), in which he suggests the ultimate extinction of the third molar, as an attendant of progressive mental development. In this line of investigation also, in confirmation of Prof. Flower's remark that persistence of deciduous teeth was not always attended by suppression of the permanent tooth, I wish to record the fact, that of twenty-seven cases of extreme persistence of the first deciduous molar, only fifteen cases were attended by suppression of the corresponding bicuspid.—JOHN S. FLAGG, L.L.D., M.S., D.D.S., *Worcester, Mass.*

**NITROUS OXIDE GAS.**—Dr. J. E. Register, in the May number of the *DENTAL COSMOS*, has given us his method of making nitrous oxide gas. My method, which I think equally good, is as follows: Use burning gas for heating. Fill the retort half full of fused ammonia; do not pulverize it, but use as sold. Suspend the retort on the arm employed for that purpose, and turn the gas on full head, using a common Bunsen burner. Tap the bottom of the retort from side to side over the flame. When the ammonia is about half melted, shake the retort so that that which has clung to the sides may be thrown into the liquid portion. Connect the retort with the jars and set the burner directly under the center. When the mass reaches the boiling point, turn the flame half down, and keep it at that point until all the ammonia is generated into gas. In this way a meter of forty-five gallons' capacity can be filled in one hour from the time of lighting the gas. When there is trouble from the jars leaking gas around the stoppers and tubes, it may be overcome by making rims of tin, three inches high by four inches in diameter, and putting them over the necks of the jars, placing the stoppers with tubes in them in their right places, and pouring plaster around the neck inside the rim, covering the tops of the stoppers.—E. F. STEVENS, *South Boston, Mass.*

**DEFICIENT DENTURE.**—With this I send you casts of the mouth of Miss D., aged 13, who recently called upon me to ascertain if she could be supplied with an entire artificial denture. An examination of her mouth revealed the fact that she had never erupted but six of the superior temporary set, five of which, though quite loose, still remain. No tooth belonging to the permanent set has erupted in the upper jaw. The lower jaw presents five of the deciduous set,—all that have been erupted,—and the permanent right central, this being the only tooth of the permanent set which has shown itself. The girl, according to her mother, has always enjoyed good health. The gums look healthy and are very hard; the saliva is thick and ropy. Is this condition of things likely to have resulted from inherited syphilis or scrofula?—G. W. THOMPSON, D.D.S.

**ANOTHER FACT ABOUT AMALGAMS.**—Prof. J. Foster Flagg, in his new book on plastic fillings, states that alloys that have been "cut" several months need less mercury for their amalgamation than those recently cut. This fact was new to me. I have just experimented with two alloys, which I have had on hand for twelve months or more. One, which when new, took 50 parts of mercury to 100 of filings, *now* takes but 40 parts of mercury. Another, which took 48 parts of mercury to 100 of filings, *now* takes but 38 parts of mercury. I have no explanation to make at present of this singular fact.—HENRY S. CHASE.

I WOULD suggest that manufacturers of gold foil supply the profession with ribbons of different widths, and thus relieve practitioners of the trouble of cutting them from the leaf and prevent its quality being injured by handling.—E. B. R.

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ORIGINAL COMMUNICATIONS.

THE ESTHETIC IN OPERATIVE DENTISTRY.

BY JAMES TRUMAN, D.D.S., PHILADELPHIA, PA.

(Read before the Odontological Society of Pennsylvania.)

WE have certainly reached a stage in the progress of our specialty when the question should be calmly and rationally considered: What constitutes esthetic dentistry? We have been so occupied in the past forty or more years in building up a profession, that the details have in some measure been lost sight of, and they are only now just beginning to receive the attention which their importance demands. This feeling is manifested in the questioning of old ideas, and a more careful consideration of the new; in a determined seeking for truth regardless of authority,—an iconoclastic disposition which, unless properly directed, may run to serious evil; in a word, the profession in its ideas and practices is fast entering a condition bordering on the chaotic. It is therefore well to stop to consider whither tends this unsettled condition, and what means can be taken to organize the active thought and direct the practice to a course of procedure worthy an intelligent body of workers. This cannot be accomplished by one man, but must be the work of many. That the present is an important period for active effort must be conceded; for if the disruptive tendencies, now so prevalent, be not properly directed, it is apparent that there must be a serious deterioration in theory and practice as well as in esthetic culture.

The dentist of to-day is the outgrowth of the dental mechanism of the past, whether we view it from the stand-point of the so-called operative or the mechanical branch. The ideas prominently ingrafted on the earlier workers were purely of the latter order. To be a good worker in metals as a base for artificial teeth, or a good filler of cavities, was the sole aim and ambition of the earlier dentist. The difficulties that hedged round both these performances



naturally induced a close absorption of all the intellectual powers of the period, and that it was not unworthily bestowed, the skill manifested to-day is the honorable evidence. This constant and earnest effort to do a few things well, while worthy of the highest commendation, has a tendency to force the mental strength into set channels, and to just that extent weakens its power to grasp subjects in their entirety. To illustrate,—the dental mechanic, intent on making an artistic piece of work *out of the mouth*, has failed to cultivate, it may be, the ideal of an artistic structure *in the mouth*, and, while his lines of beauty may be skillfully arranged for the one, they are out of proportion and inappropriate for the other. So the filler, in his anxiety to save teeth, builds his gold until it assumes and exceeds, in his eye, the loveliness of nature. Thus, gradually, but surely, we have developed mechanism in both branches at the expense of the artistic, while the true work should combine all that is possible of both. These thoughts are, doubtless, truisms to all, and will probably find no opponents; but, while the facts are admitted, such is the perversity of human nature, that they are rarely acted upon. Thus, while the extreme of effort in the operative has brought our gold-work in the mouth to such a degree of mechanical perfection, that any advance with that metal cannot be looked for or desired, it is evident that this very perfection has generated sentiments of opposition, in both patients and operators, that has resulted in the development of a new school that entirely repudiates this metal. Between these two extremes we have all shades of thought and practice.

It is not the purpose of this brief paper to enter upon the discussion of this subject, but rather to suggest another direction that may possibly be of value to some who aim to be something more than mere extremists. We are not all molded alike. We cannot all be painters and sculptors; neither are we all so formed by nature that we can work up a beautiful ideal, or, even if capable of so doing, give it practical form.

Dentistry to-day occupies a very similar relation to esthetic culture that our country does to the arts. It has been the constant reproach of the old world that we were a nation of shopkeepers and mechanics, and we have been sneeringly told that high art was an impossibility from such a basis of unrefinement. The true observer of men and nations, and, above all, of the gradations of mental progress, well understands that the higher expressions of intellectual force are but a combination of lower and, it may be, grosser forms. The mechanic at his bench, the house-wife with her needle, are each in their way cultivating form and ideality, and laying the foundations for a higher expression of these same qualities, and rendering

it possible for the finest manipulation of art in the future. Thought concentrated in one direction in the parents becomes, by the law of inheritance, the fixed and higher talent in the child, and thus, step by step, and as the result of progressive development, the advances are made and conditions established for the ideal artist. What is true of individuals is true of nations, and it is reasonable to infer that the development of this country must be towards the finest exhibition of artistic excellence the world has ever seen. This is already becoming manifest, and, unless unforeseen drawbacks occur, the prophecy of a Munich professor, made to an artist friend, "that the time would come when Europe would send pupils to America to study art," will have its full realization.

The same law of evolution holds good in our profession; and, while we may not be equal to our idealistic conception, we may at least reach out toward it and endeavor to correct each other, and so hasten a better day. It is with this idea that this paper has been written.

The dentistry of the present is essentially, in many of its manifestations, barbaric. It is the unrefined expression of the mentality of the bench-worker, not yet advanced through the natural siftings to a higher condition, and hence we witness those fearful monstrosities in both sections of our art, but especially in that of the mechanical branch. This latter has been ably illustrated by Dr. W. Warrington Evans, of Washington, D. C., in a series of papers in the *DENTAL COSMOS*, 1880-81, and I am, therefore, saved reference to that portion of the subject, further than to refer and indorse most heartily his conclusions. The operative section has been allowed to have its own way, drifting more and more into pure mechanics, and becoming more and more self-asserting, more and more a violation of artistic laws, and more and more depending for its success on the skill of the mechanic rather than the brain of the operator. The point in the history of the profession from which we may date this departure was the introduction of cohesive foil. This, while it marked a great advance, introduced a tendency to exaggerated expressions and exaggerated ideas of the value of gold. If it did not give rise to the now exploded maxim, "The tooth that is worth filling at all is worth filling with gold," it at least enforced it; and he was a bold man who dared to express a contrary opinion. The extreme limit was finally reached, and a natural reaction set in with its equally reprehensible ideas.

That gold can be worked up into forms of beauty, it needs no argument to prove; that it can be made to serve the purposes of preservation and use every day demonstrates; but that it adds anything to beauty, when combined with the natural organs, all who claim

any taste must deny. It belongs to the incompatibles; its strong contrasts of color must ever debar it from the roll of the beautiful in this connection, and yet, just here, in some minds, it has its greatest value. In nature we have the gradations of color peculiarly demonstrated in the teeth, changing from one color at the edge to a darker at the neck, until, through almost imperceptible variations from teeth to gums and from these to lips, we have a perfect harmony of expression. Ruskin says, "No color exists in nature, under ordinary circumstances, without gradation. . . . The preciseness and pleasantness of the color itself depends more on this than on any other of its qualities, for gradation is to color just what curvature is to lines, both being felt to be beautiful by the pure instinct of every human mind, and both considered as types expressing the law of gradual change and progress in the human soul itself."

The building up of a tooth was in former years considered the highest expression of our art. So beautiful was it in the estimation of some, that to make a gold front tooth, and shape it in the form of the original, was regarded as an exquisite piece of dental mechanism, and the operator viewed his skill with the satisfaction of having accomplished a masterpiece. In one sense this was true. It was a masterpiece of pure skill, but at the same time it was direct evidence of skill misapplied in the production of a contribution to a barbaric taste. It had the merit of being useful, while the gold ring in the nose of the savage has not; but both deserve to rank with the productions of an uncultured era. The production of the few teeth of this kind has been followed, through the introduction of machinery and the easier application of force, by the presentation of many such operations, until we have the mouth in a glitter of disagreeable contrasts that are disgraceful to us as a profession, and are building up in our patients false standards of taste, for which the doubtful advantage of use does not furnish a compensation.

The so-called axiom, that "any tooth, no matter how defective, if it can be saved and made to subserve a useful purpose, is better than a false one," has had largely to do with this. That this is based on incorrect ideas and mere assumption, must be apparent. Even under old modes of insertion of artificial teeth it was never true, and now, with the advances made in this department, it is even less so. It is assuming that artificial teeth are partial failures; that they are, at their best, but imperfect substitutes, while the truth is that, in the large majority of cases, they are not only substitutes, but perform the work so perfectly that the wearers do not appreciate any difference in the ability to masticate food or the correct articulation of sound between these and the natural organs. This matter has received careful consideration from the writer, and it is a posi-



tive conviction that the attempt to save a certain class of teeth at the risk of permanent disfigurement of the patient, is a stretch of professional skill wholly unwarranted. That this will be regarded as an extreme statement, and at variance with accepted teaching, I am well aware, but it remains for those who controvert it to demonstrate its incorrectness. I wish, however, to be distinctly understood at this point. While condemning the undue exhibition of gold on the anterior teeth, I do not wish to be understood as opposing its free use in posterior teeth, for here use supersedes taste; indeed, that does not enter at all as a question at issue. Neither would I condemn the moderate exhibition of gold on approximal surfaces with labial fractures, but I do condemn that excessive use of this material on the labial surfaces, which carries, by its incongruity, a sense of disgust to every beholder. I need allude here only to the minor manifestation so frequent of this sin against taste in the filling, oftentimes large, of all the anterior teeth at the upper labial thirds with gold. The expression that this gives to an otherwise beautiful face need only be seen to be fully appreciated. Attempts have been made in this form of caries to insert a section of porcelain or of tooth-bone, but this, while an effort in the right direction, has been only partially successful, and it is by no means the general practice. Gold is the one material we have for this operation, and any departure from its use is regarded as worthy of severe condemnation. It is true we have no material that equals it for tooth preservation, but it is a question whether a poorer one and one nearer the color of the tooth would not be better than a piece of work which is a constant monument to our ignorance of the law of contrasts. Yet, while this is asserted in regard to these peculiar and most annoying cavities, even here gold may have a very proper place, provided an intelligent consideration of the probable issue of such an operation be carefully made,—such as length of lips, facial muscular movements in talking, laughing, etc., the sex of the individual, and the extent of the lesion.

It is not to gold, primarily, that objection is made, but to its use in inappropriate places. As a material for filling, it will always, probably, retain a royal position; properly used, it is the best material for a very large class of cavities; but to assert that its proper place is to restore lost teeth in the anterior parts of the mouth, or to universally repair lost sections, is to claim that which no refined intelligence can for a moment tolerate. The influence of such work is demoralizing on both operator and patient. It is an ever-present sign of partial culture, and partial culture in art mechanism, as in everything else, is just so far an evidence of inefficiency, if indeed, it is not positive evidence of it. The true dentist

is something more than can be made by a mallet and a sheet of metal. He is a combination of varied experiences of the past and present. He aims to grasp reasons and to search into the philosophy of things. His diagnoses and prognoses are carefully made, and his course is guided by his conclusions. He regards his material, whatever it may be, simply as a tool, and, as he cannot effect the best results with one form of instrument, he must make use of many. He believes that the intelligent adaptation of means to ends is better than a blind following that leads only to inconsequential results. He refuses to replace nature's destructions by a disfigurement of nature; and, above all, he aims to combine the practical with the esthetic, that use and beauty may go hand in hand, and through his work his profession may receive a new impetus toward a higher standard of excellence.

### HYPERIDROSIS.

BY W. C. BARRETT, M.D., D.D.S., BUFFALO, N. Y.

IN the last December number of the DENTAL COSMOS appeared an inquiry from a sufferer asking for the cause of excessive sweating of the hands, to which, though I have waited long and patiently, I have, as yet, seen no satisfactory answer in any of the journals. Hyperidrosis is the technical term for an inordinate perspiration, and it may be the result of a variety of causes, and either general or local in character. That is, the entire body may be periodically bathed in an unhealthy exudation, not the effect of heat or exercise, or the sweating may be confined to a portion of it, as to a single organ. It is well known that perspiration is the normal secretion of the sweat glands, which are found in every part of the cutaneous surface, though not equally distributed, some portions being more abundantly supplied than others. Thus, on the posterior parts of the body, there are about five hundred glands to the square inch. On the anterior portions, the dorsum of the foot and hand, etc., there are about one thousand, while on the palmar and plantar surfaces as many as twenty-seven hundred are found. The perspiration is, of course, derived from the blood, is a constant secretion, and every physiologist knows what an important part it plays in the human economy. The skin is the great emunctory of the system, and from it are thrown off about two pounds of solid and fluid matter in every twenty-four hours. Ordinarily the cutaneous perspiration is not observed, because it is evaporated as fast as exuded. But while this secretion is constant it is not always the same in quantity, but may be increased or diminished by attendant circumstances. One of its most important offices is

to maintain an even temperature of the skin. If we subject ourselves to an unusual degree of heat, or if by immoderate muscular exertion the bodily temperature be raised, the sweat glands are stimulated to increased action, and the evaporation of the moisture exuded reduces the degree of heat; thus each function regulates the other, and an equable temperature is maintained. Evaporation is, of course, largely dependent upon the hygrometric condition of the atmosphere, so that the bodily comfort is not always preserved by evaporation. In a dry air the skin is kept cool at a temperature that would be unbearable if the atmosphere were laden with moisture. I have remained for some time in a room where water would boil in an open vessel beside me, while an air saturated with steam, but nearly an hundred degrees lower in temperature, was almost insupportable. The perspiratory glands have then a very important function, and it was necessary for me to review these simple elementary principles before proceeding to a particular consideration of my subject.

When function is properly performed, the result is the physiological condition called health; when it is deranged we have the pathological state of disease. General hyperidrosis, then, would indicate a general malaise, and this condition is accordingly found in phthisis, malaria, and general debility.

As the glandular system of the body is controlled by the sympathetic, it will be readily understood that a condition of nervous exhaustion, or of depressed neural function, will probably be accompanied by irregularities of the perspiratory system, and as three or four times as many sweat glands are found upon the soles of the feet and the palms of the hands as upon the average surface of the rest of the body, it will be readily comprehended that this disorder is much more common upon these surfaces than upon any other; these local disturbances are called plantar or palmar hyperidrosis, according to whether the feet or the hands are affected. The former is much the more troublesome, because the soles of the feet are but little exposed to the air, and because too frequently they are enveloped in coverings which are either quite impervious to moisture, or which become so through being loaded with the natural exudations of the skin; for, while the amount of perspiration from the palmar and plantar surfaces may be equal, the hands are relieved through free evaporation, while the feet remain sodden in their own excretions.

The etiology of local hyperidrosis is not so clear as that of the general system, and the literature of the subject is very deficient. But as those parts of the skin containing the greatest number of sweat glands secrete the greatest amount of perspiration, it is but



reasonable to infer that the first symptoms of that which in the further progress of the pathological condition might become manifest as general, here exhibits itself as local hyperidrosis. We would then naturally expect it in the earlier stages of such diseases as induce a depressed general tone of the body, and especially as accompanying and diagnostic of an atonic condition of the nervous system. Accordingly, Dr. Beard, in his excellent treatise upon "Nervous Exhaustion," enumerates palmar hyperidrosis among the prominent symptoms of neurasthenia, and expresses his astonishment that the literature of the subject is so meagre. He says that it is most common in males, an observation which my own limited experience does not corroborate, and relates cases in his practice in which this symptom was so severe, that one patient was compelled to carry with her a number of handkerchiefs, which soon become saturated with moisture; while another, a young man, when writing, was obliged to have a pad beneath his hand to keep the paper dry; another seriously contemplated suicide to obtain relief from this unbearable annoyance. All these patients were neurasthenic. That local hyperidrosis is usually connected with some disturbed condition of the nervous system is proved by the fact that it is frequently excited by nervous impressions. Insane persons, who are almost invariably neurasthenic, are usually afflicted with local hyperidrosis, and physicians in insane asylums declare that they exhale an odor as peculiar as it is characteristic. We know that in certain states of nervous exaltation or excitement, as in a paroxysm of fear, a profuse perspiration is apt to break out, and this quite apart from the state of bodily temperature, for a "cold sweat" is proverbial. In embarrassing circumstances, in excessive diffidence, in times of great anxiety, in mental distress, in great bodily exhaustion, in a state of extreme restlessness, in insomnia, an excessive perspiration is common. It is then clear, that many cases of local hyperidrosis are due to the neural condition, and there is little doubt that this is by far the most fruitful source of this affection. According to Adamkiewicz, local hyperidrosis may be produced by the electric current; he caused sweating of the paw of a cat by faradization of the sciatic nerve, and this even after the animal had been killed. But while to nervous disturbances may be due most cases of this disorder, local influences doubtless bring about a certain proportion, and these may be caused by some irritable condition of the skin, some relaxed state of the blood vessels in a definite territory, or some restricted stimulus of the perspiratory glands.

Hyperidrosis may be so excessive that the skin has the wrinkled appearance which the hands or feet assume after long immersion in warm water, and yet it may cause no other inconvenience. But in

other instances the perspiration seems so loaded with effete matter of such fetid quality, that decomposition almost immediately supervenes, rendering the exudation exceedingly offensive, so that the utmost care is necessary on the part of the patient to avoid becoming positively noisome. The perspiration in the neighborhood of certain glands, as those of the axillary and inguinal region, is quite apt to be tainted and offensive. That the exudation of the plantar surfaces is often nauseous is more frequently due to a lack of cleanliness than to any other cause, the perspiration not being removed until decomposition has become advanced.

The treatment of hyperidrosis will, of course, depend upon its etiology, and the practitioner must bear in mind the fact that it is symptomatic of some more recondite pathological condition. If it be general, and but one of the indications attending some peculiar diathesis, efforts will naturally be directed toward the cachectic conditions. If it be local, and the result of nervous exhaustion, every means should be adopted to build up the system and restore the nervous tone, such as tonics, a liberal diet, careful attention to hygienic conditions, and plenty of out-of-door exercise. If it arise from some local disturbance, the cause should be traced out and removed. But the majority of men do not care to go below the surface and search out the hidden springs of disease. The effort is too great, either for their knowledge or their inclination. It is so much easier to seize upon some supposed specific and prescribe that empirically; and this is why men will leave the intelligent, educated physician or dentist, and seek for quack nostrums warranted to cure everything from corns to consumption. The regular practitioner invokes the reason, and this requires an effort of mind on the part of the patient. The charlatan appeals only to the credulity and imagination. Prayer-cures and faith-miracles will not cease until men gain intelligence; but with the illumination of scientific knowledge these superstitions will fade away.

I presume then, that the majority of my readers will consider this article incomplete unless I give them something "practical," and recommend some infallible cure for this evil. That is just what I am quite unable to do. In plantar hyperidrosis, partial relief may be found by keeping the feet scrupulously clean. Cloth shoes should be worn, and the foot-coverings frequently changed. Should the perspiration have a fetid odor, some anti-putrescent should be used with an absorbent powder, and for this purpose three parts of salicylic acid to eighty-seven parts of magnesia silicate, as recommended by a correspondent, is as good, probably no better, than a hundred others of like character. Temporary relief may also be obtained by the use of saline cathartics. Hebra, as quoted by Prof. Piffard,

recommends a course of treatment which shall result in an exfoliation of the epidermis.

In palmar hyperidrosis nearly all the astringents have been used with uniformly questionable results. Jaborandi has been highly recommended for internal use, but this drug, like most new remedies, has been urged for nearly every ill to which flesh is heir, and its use in hyperidrosis has not proved any more effective than many other agents. Belladonna, or its alkaloid, atropia, will undoubtedly bring temporary relief, but the drug must be given in comparatively large doses, and the effect remains no longer than the patient feels the toxic influence of the remedy. As Prof. Piffard says, "Whether it is desirable to keep the patient in a chronic state of belladonna poisoning, each practitioner must judge for himself."

The summing up of the whole matter is, that hyperidrosis, whether general or local, is, as before stated, usually a symptom attendant upon some pathological condition, and when the organ or system affected returns to a true physiological state, this symptom will disappear with the others. In the mean time, reliance must be placed upon cleanliness and local absorbents.

## REGULATION OF TEETH MADE EASY BY THE POSITIVE SYSTEM.

BY J. N. FARRAR, M.D., D.D.S., NEW YORK CITY.

(Continued from page 307.)

No. XV.

SPREADING OF THE ARCH.

### *Tying and Binding Mechanisms to Teeth.*

WITH a knowledge of the principles set forth in the last paper, it will be seen that, under certain circumstances, the permanency of regulating devices can only be secured by more positive means than simple impingement. How this may be done will now be considered. Beginning with some of the simpler methods, let us examine the oldest, and in some respects one of the best, namely, the use of the string.

It is the boast of some operators that they can do anything in the line of regulating teeth with a string and a piece of rubber tubing. The question, however, is not one of possibilities,—whether we can or cannot move a tooth in this or that direction,—but whether it is or is not the most convenient way,—the best way.

In regulating teeth, I think that the main consideration should not be so much the first cost of the devices used as the subsequent convenience of the patient and operator, together with the assurance of final success.



If teeth were always advantageously shaped, and stood in desirable positions in their sockets, and there was no saliva to increase the tendency of devices to get out of place, we might, without much difficulty achieve the wonders with strings and tubing that are sometimes claimed; but, with these drawbacks always more or less present, it is absurd to expect everything of these appliances, even in the hands of experts.

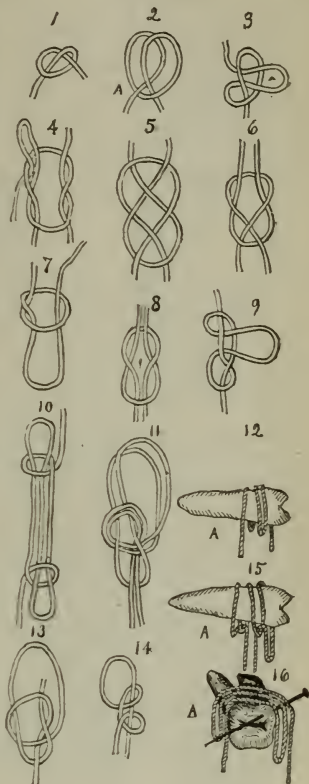
The string and rings cut from tubing, however, have their uses, especially in the management of some of the simpler cases of children's teeth, which often yield to slight manipulation.

The string is useful to supplement mechanical devices and as an auxiliary to retain them in position; but its value depends largely upon the degree of skill exercised in the method of tying, so that it will not yield when soaked with saliva. Under the ever-varying circumstances, the form of knot necessarily must be left to the judgment of the operator; but, for the benefit of some of my younger readers, thirteen of the most useful are herewith diagrammatically shown.

Fig. 97 represents thirteen forms of the most useful knots. 1, thumb-knot; 2 (12, 15, 16), various stages of the clove-hitch; 3, drag-, rope-, or lever-hitch; 4, draw-knot; 5, garrick-bend; 6, common or sheet-bend; 7, running-knot; 8, reef-knot; 9, men's harness-hitch; 10, sheep-shank; 11, double bowline-knot; 12, first stage of clove-hitch; 13, single bowline-knot; 14, half-hitch; 15, second stage in the clove-hitch.

Although different operators have their favorite, most of them prefer the "clove-hitch" and the common, or "reef-knot." Besides being useful for fastening devices to teeth, and as a means of temporarily patching up broken and defective ones, the string, although very uncleanly and disagreeable, is sometimes excellent for drawing teeth into position by repeatedly lashing them firmly to metallic bands. Especially does this apply to the front teeth. An entire paper might be written upon the virtues of the string as used for this purpose, but, as it is so old and well understood, it does not seem necessary.

FIG. 97.



The preparation of bands and plates for binding by means of the string is done in various ways. The principles of some of the more useful and well-known (because old) are illustrated in Fig. 98.

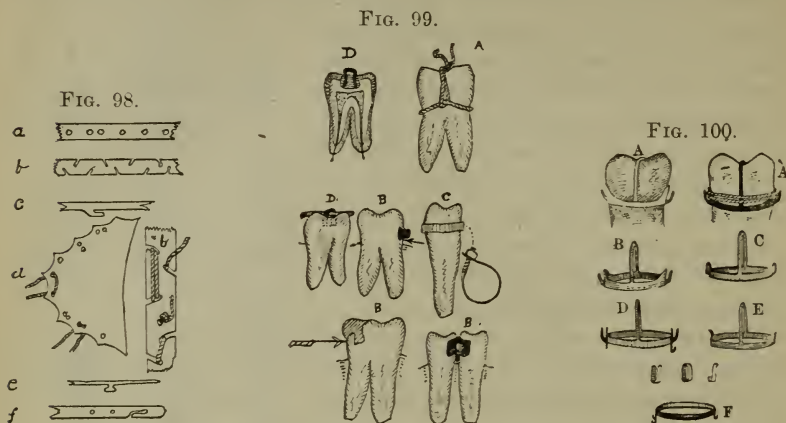


FIG. 98.—a, portion of metallic band, with holes for strings; b, b, portions of a similar band, with slits for strings; c, e, f, portions of bands, with hooks and prominences for strings; d, plate, with holes for strings.

FIG. 99.—A represents an old means of holding the binding-string in place by another string passed under it, and thence over and along the sulcus of the tooth. The same object may often be better gained by the use of surplus plugs, screws, or pins (B, B, B), or by bands, somewhat as shown by C, or by a staple, fastened into cavities (D, D), by means of some plastic material.

FIG. 100.—GUARD-RINGS.—A, guard in position on a bicuspid tooth; A', the same, showing the application of the string; B, C, D, E, different modifications of guard-rings for bicuspid teeth; F, guard-ring, suitable for any of the six front teeth; L, different modifications of lugs.

One of the chief niceties in tying a string is to so do it as to prevent its slipping and injuring the gum. A few of the various ways of avoiding this evil are shown in Fig. 99. The conditions which render these latter methods applicable, although present very rarely, are of great advantage when available.

To surmount the difficulty of the slipping of the string under the gum, I make a little guard-ring, which is worn on the tooth. Different modifications of this unique instrument are illustrated in Fig. 100. This long-sought-for desideratum consists of a thin gold or platinum (closed) band, about one-sixteenth of an inch in breadth, which is made to fit snugly, though not tightly, around the crown of the tooth, and which, when in position, rests immediately in contact, or even slightly below the margin of the gum. As a means of preventing the slipping of this ring against and injuring the gum

around teeth that are posterior to the cuspids a piece of fine wire or narrow plate, thin at the extremities, is passed along the sulcus of the tooth; and, being of sufficient length, it extends over the approximal surfaces to the ring, to which it is soldered. On the lingual, buccal, or labial side of these bands, and sometimes on all sides, are soldered little ear-shaped lugs, or perhaps rings or loops, over or through which rests the string (or whatever is used instead), so that it cannot get out of place and work into the gum.

With incisor and cuspid teeth the guard-ring F (which has no "bail") is forced upon the crown, until it rests snugly on the lingual prominence near the neck. When the rings are in position, the ears or lugs should rest close to the margin of the gums on the lingual or on the opposite side of the tooth.

A far more valuable use for these guard-rings is in connection with metallic "slide-bands" (mentioned in previous papers), which are not only more cleanly, but are better and less irritating than strings. In practice it is often better to use only one lug, leaving the string or sliding-band to rest independently above, on, or below the band on the opposite side. This is especially true in many cases where the slide-band is used, for by this freedom there is less liability of displacement of the other portions of the mechanisms. Kept in various sizes, ready for immediate use, these gum-protectors are of incalculable value for surmounting with ease one of the greatest difficulties to be met with in regulating teeth.

Sometimes cases present themselves which require the forcing more widely apart of two or more teeth in order to make room for another. Such cases often require great power in a small machine. The two following groups of diagrams (Figs. 101, 102) represent several modifications of devices for this purpose. J, Fig. 101, represents a jack-screw, one-quarter of an inch in length, which is soldered to a metallic saddle (R), which rests on the gum between the teeth to be forced apart. The screws are intended to impinge nearly on the line of the gum against the necks of the teeth. To steady the instrument in position, little wire arms (F) are soldered to the saddle (R), which extend on either side of the teeth, thus acting as stays. Z, Z, represent different but more useful varieties. The jaws, C and H, are stationary, while those of D and I are movable, and play upon the neck of the screws E, E, which have collars to hold them in place. These are strong and delicate, and are easily applied and operated by the patient. W, W, Fig. 102, represent two forms of separators, made on the prin-

FIG. 101.

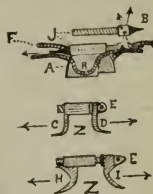


FIG. 102.





ciple of the wedge. The heads, V, O, and S, S, are so shaped that when they approach each other by means of the screws U and P they impinge like a wedge upon the teeth, T.

In my next paper we shall consider a more positive class of mechanical devices for the purpose of spreading the arch.

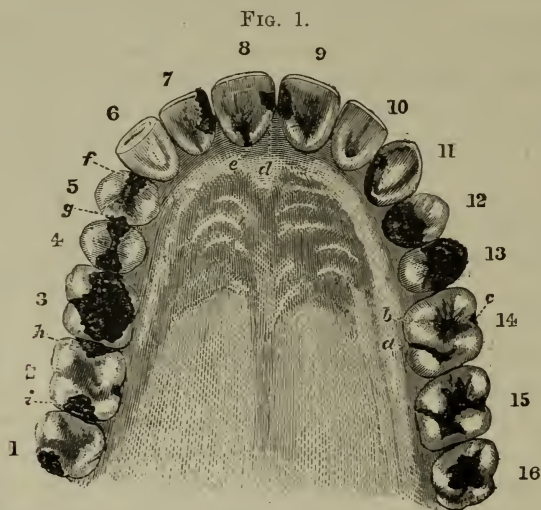
(To be continued.)

## OPERATIVE DENTAL SURGERY.

BY W. FINLEY THOMPSON, M. D., D. D. S.

(Delivered at the National Dental College, London.)

REFERRING to Fig. 2, will be seen the inception of disease on the labial surface of a right central incisor. Here are found several spots, which, on examination, show that the organ has lost its osseous integrity. The surrounding tissue may be dense and hard, in which case the small cavities can be filled so as to avoid the appearance of a mass of gold; but the contiguous structure will usually be found soft, with disintegration extending into the approximal surfaces, necessitating the removal of the morbid tissue.



Decay of the teeth as frequently seen in the different stages.

The disease sometimes, however, concentrates in one place, as figured in the lateral, instead of forming a collection of spots as in the central (Fig. 2), which may not extend far under the gum, but may have a tendency to spread in a linear manner, as shown in the canine. This may continue in either direction, until it nearly encircles the tooth; but should the depth of the decay bear any great

proportion to the diameter of the organ, the crown may be fractured vertically or transversely. The forms of decay here presented are frequently signs of approaching senility, the more marked indications being the attenuated condition of the cervical portions of the teeth, accompanied usually by recession of the gums.

The second condition of the disease is now reached, *i.e.*, "An advanced stage of caries with encroachment on the pulp."

The several points of decay illustrated in Fig. 2 may merge into one cavity, and assume the appearance presented in Fig. 3, illustrating the third stage. The lack of bulk makes this in the incisors nearly equivalent to the fourth stage.

FIG. 2.

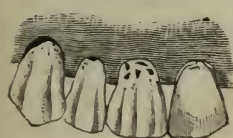


FIG. 3.

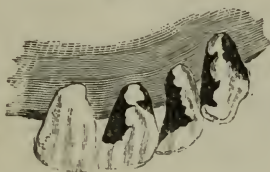
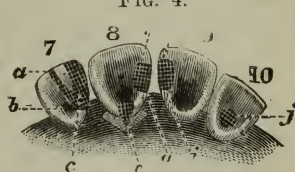


FIG. 4.



The second stage is also exemplified in the incisors, Nos. 7, 8, 9, and 10, Fig. 1. The pulp here is not yet involved, being protected by a dark layer of dentine which is the seat of a passive form of decay, sometimes presenting a hard and dense appearance. Examples are frequently seen of the apparent arrest of disease after an extended encroachment on the body of the tooth; the darker and more repulsive its appearance, the more effectually protected seems the organ. This, no doubt, is to be attributed to a deposition of earthy matter in the calcigerous cells,—a physical or a physiological phenomenon,—which causes the tooth to lose its distinguishing characteristics. Fig. 4 is intended to illustrate the cavities shown in the corresponding portion of Fig. 1, filled, the teeth being restored to their original shapes.

In No. 7 of this figure, is represented a filling built upon a right lateral so as to give the greatest security. Obliquely along the lingual wall will be seen an arm or extension, which is intended to aid in the support of the filling—the mesial portion of the enamel still existing on the labial wall of the tooth; this is sometimes so frail as to require most careful bracing. At *a* is shown the retention point on the cutting-edge, while *b* and *c* indicate the anchorages at the base. In bridging the intermediate portion of the tooth between the extension and the central body of the filling, a septum is left on the tooth intermediate between the two extensions, over which the filling is carried until the whole lingual surface is closed in, extending from the mesial point to that designated at *a*.

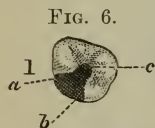
The superior centrals (sub-figures 8 and 9), represent the teeth restored to their full contour. The cavities in the *mesial* region extend antero-posteriorly to the labial wall, and in their preparation require to be cut vertically, both to the approximal and lingual surfaces, and in a rectangular form, viewed in any of their three dimensions. The location of the anchorages is indicated by the dotted lines pointing from the letters *f*, *g*, *h*, and *i*. On the right central, decay is seen upon the lingual aspect, *e*; this type involves treatment by incision of the gum. Caries, as frequently seen on the lingual wall of the incisors, is represented, after filling, in No. 10, *j*.

The second stage may cover a superficial area of considerable extent, the body of the tooth still being an excellent basis on which to restore with gold. This necessitates work very similar in appearance to that required in the fourth stage, Fig. 5, showing an instance which came under my notice: *a*, point to which



the filling extended under the gum; *c*, the only remaining portion of enamel. Here the disease, without touching the pulp, had spread over the greater portion of the lingual surface of a canine and under the margin of the gum on the distal surface, to the point indicated by *a*; it had also extended over the major part of the labial aspect, diverging on the cervical border in a mesio-distal direction. Of the whole lingual wall of the tooth, it was possible to save only the strip of enamel seen in the figure, which extended from the mesiolingual point to the opposite approximal boundary.

The location of caries represented in Fig. 1, No. 1, disto-buccal surface of the third molar, is the most difficult of treatment of any in the mouth. Fig. 6 represents the cavity filled; *a*, *b*, and *c* showing the points of anchorage.



In operating in cavities of this class, it will be necessary to adopt such measures as may suggest themselves in each individual case. In preparing the cavity, the anchorages should be formed at the base of the walls radial to the coronal center, at locations indicated in the diagram. The greatest power of resistance, however, will be obtained by slightly changing the direction of the converging walls, causing them to again diverge before joining with the semicircular wall of the medial region. At *a* and *b* grooves are formed along the vertical walls, which should be solidly packed with leaf foil, the body of the filling being carried along with heavier gold, the keystone of the work being the dove-tail *c*.

The application of the rubber to these teeth cannot always be made, in which case pads of bibulous paper may be so adjusted as

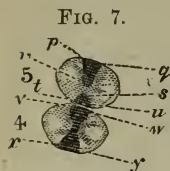


to compress the duct of Steno. In addition to this, a prop may be introduced to distend the jaws in a position not uncomfortable to the patient, yet giving an unobstructed view, if possible, of the parts to be operated upon. The maxillæ can be separated only to a limited extent; when this is passed, the buccinator muscle is rigidly contracted upon the molar teeth, causing the mucous membrane to *encroach upon the territory already difficult of access*. This, however, is but one of several obstacles to be contended with. The powerful masseter plays its part among the antagonistic forces in the contest, adding to the inaccessibility of the third molars by limiting the space through which manipulation can be conducted, and, in conjunction with the buccinator, forcing the mucous membrane into a position where it is liable to be injured during manipulation. It is, however, useful as an auxiliary to the use of pads, and in temporarily arresting the spontaneous flow of the parotid secretion into the circumscribed space for the operation. The cavity, it will be seen, is situated upon the rounded turn of the tooth and is V-shaped, the divergent part being upon the external portion. Too much importance should not be attached to the retaining power of the anchorages; these are valuable aids, but they cannot be relied on except to steady the gold during the starting period. Hyperesthesia usually exists in the wisdom teeth far in excess of that found in the other teeth, while the decay, extending in a linear direction around the cervical portion of the tooth, frequently reveals so much unsuspected territory in a state of semi-disintegration, as to cause a doubt as to when and where to discontinue the work of preparation. This has its exceptions, but, as a rule, the wisdom teeth do not permit any strong hopes of their permanent retention; in the absence of the first or second molars removed in youth, however, every effort should be made to save them.

I must now call attention to the measures required in the second stage. The limited intermediate substance between the external surfaces and the pulp restricts the disease to a very circumscribed invasion—where this organ is not encroached upon. Therefore, in a triangular cavity an anchorage is to be made in each angle, as also a minute groove at the base of the surrounding walls. In filling a cavity of this description, commence in the lower anchorage, and continue to build until the gold is perhaps half-way from the base to the upper portion of the cavity; then build in each of the remaining anchorages, working towards the center, at which point the different portions of the filling will meet and blend. On the foundation thus obtained, additional gold can be impacted until the surface of the tooth is symmetrically formed.

Fig. 7 shows the cavities in the bicuspid, Nos. 4 and 5, Fig. 1,

after being operated upon. No. 5, second stage, the filling on the ante-approximal surface at *p*, *q*, extending to the medial point.



Filling at *t*, *u*, on the post-approximal surface; *r* and *s* are points at which dove-tail steps are to be made—similar in principle to that described in the wisdom teeth—in which anchorages are formed. No. 4, third stage, represents a more extended condition of decay restored with gold, the two cavities merging into one, with anchorages at *v*, *w*, *x*, *y*.

In the conduct of operations for the first and second stages of caries, you will have an opportunity for practice which will aid you in more difficult cases, as those in the third and fourth stages, to a consideration of which we are now approaching.

The third stage I have defined as “a condition of disease involving partial or complete exposure of the pulp, without necessary loss of the same.”

The exposure of the pulp implies a series of complications which may extend over an area quite unexpected, and calls for skillful treatment, with a full recognition of the therapeutic as well as prosthetic measures to be adopted.

The study of every stage of caries should be as exhaustive as possible, because in actual practice, we find all stages in the mouth of the ordinary patient presenting for treatment.

To comprehensively present the following case in connection with its relationship to the third stage, I shall be compelled to introduce several diagrams. Referring to Fig. 1, No. 2, will be seen



the right superior second molar, which is decayed upon its ante- and post-approximal aspects. Fig. 8 illustrates the plan of the preparation of the crown-cavities, the anchorages, grooves, and steps of which are more clearly delineated in Figs. 9 and 10; *b*, anchorage in the septum—medial region; *c*, *c*, *c*, *c*, anchorages on the ante- and post-approximal boundaries of cavities; *e*, pointing to exposure of pulp, which is further illustrated in Figs. 9 and 10.

During the preparation of the ante-approximal cavity, it is discovered that the cornu of the pulp below the ante-lingual-medial point has become exposed by the intersection of the curved surface of the floor of the cavity, as is represented at *e*, Figs. 8, 9, and 10. Capping, as a diasostic measure, is indicated, but the treatment will necessarily vary with the extent to which inflammatory irritation may have been induced. The exposure involves but a small area, and may be effectually sealed from external influences by the use of thick carbolized paper which, from its pliancy, is readily adapted to the interstices in the floor of the cavity, without being inimical to

the normal condition of the pulp. The paper should be accurately adapted to the concavity, and gently placed in its position. In the absence of a special instrument, the ovoidal end of the handle of an excavator can be used to make an indentation in the paper sufficient to arch over this minute exposure. To double the paper would give too great a proportion of yielding substance in the restoration; therefore, oxychloride of zinc should be placed above the paper capsule as a protection from thermal change.

The subject under consideration cannot be too well understood; and for this reason I shall endeavor to give a detailed description of the dangers which encompass the attempt at preservation of an exposed pulp. The repeated excitation of this organ, or continued irritation for any length of time, materially augments the morbid tendencies. Commencing with local irritation, followed by congestion terminating in suppuration, the disease ultimately extends to adjacent tissues, when it can no longer be considered local, but is systemic, and must be treated as such. The cornu, not being in any particular plane, curves concentrically with the surfaces of the teeth.

Fig. 9 shows a tooth split between the lingual and buccal roots to show the third stage of disease: *a*, parietes extending from the grinding surface of the enamel to the more solid body of dentine

FIG. 9.

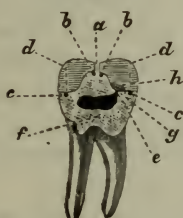
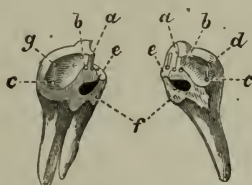


FIG. 10.



covering the pulp-chamber; *b, b*, anchorages in the medial region; *c, c*, anchorages in the post- and ante-approximal regions; *d, d*, terminations of the grooves under the enamel; *e*, point of exposure of the pulp; *f*, fractured surface; *g*, carbolized paper capping the pulp; *h*, oxychloride of zinc, interposed as a non-conductor to thermal influence.

Fig. 10 is intended to more clearly reveal the condition shown in Fig. 9: *a*, walls between cavities; *b, b, c, c*, anchorages; *d*, groove; *e, e*, point of exposure; *f*, fracture; *g*, prepared cavity.

The difficulty presented in this instance does not, however, express the degree to which, by complication, even the initial exposure of the pulp may be aggravated. In the case before us, the cornu has been intersected at a point; but should the area of disease assume a



parallelism with the superficies of the pulp-chamber, a single stroke of the excavator may remove the osseous covering and reveal a projecting angle; or a portion of the parietes may be destroyed, causing an exposure of a very appreciable length and breadth. Such an occurrence is sometimes further aggravated by the accidental penetration of the pulp, which must be met by the adoption of methods of obtunding pain commensurate with the gravity of the occasion. The increased vascularity of the pulp where the floor of the cavity is porous, causes actual hemorrhage to occur before the pulp is impinged upon. Should, however, there be no firm basis reached, it will be proper to leave a thin layer of even imperfect material over the pulp, as exposure is always to be considered a disaster, and to be avoided. In preparing the cavity, increase the circumferential area in which to cut a rudimentary groove around the fractured surface. A metal cap can then be adjusted in conformity to the shape of this groove, its concavity being such as to cover, without touching, the pulp. Oxychloride of zinc will now fix the cap in position, and also act as a non-conductor; but the anchorages and grooves, on the principles enunciated, will have to be made at points independent of the floor of the cavity.

The preservation of the pulp cannot always be hoped for from capping; the practice, however, has met with such success as justifies its adoption, and I need hardly add that it is a distinguishing feature in conservative treatment. With the pulp devitalized, a legacy of weakness is left to the tooth; discoloration ensues, and this portion of the economy as it dies so involves its ally—the periodontal membrane—as to threaten its destruction. Commencing with passive congestion, it runs through the different stages of disease, until the general system is incited to rebel against the inanimate cause of such discord, even to ultimate rejection and expulsion.

If the pulp can be protected from external influences, the formation of secondary dentine, though problematical, is greatly favored. When the pulp-chamber has been but recently invaded, it is not unreasonable to expect that treatment by capping will be successful; with an extension of time, however, the case becomes more aggravated, owing to atmospheric and mechanical action upon the pulp.

Opinions are much at variance as to the benefits derived from different materials used for capping; for as all remedies are valuable only from their appropriate use, experience of their applicability is required to ascertain the circumstances in which they are truly of service. The means of capping, in all cases of recent exposure, are directed with a view of restoring the pulp to a normal condition. Previous, however, to such treatment being adopted, it is necessary, if pain exists, to subdue the paroxysms by mild but active measures.

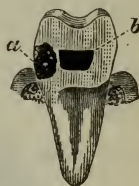
Any tendency to pulpitis must be aborted, and a quiescent state induced, before recourse can be had to capping.

The treatment depends entirely upon the circumstances of the case. Anodynes are indicated, but they should not be employed indiscriminately nor without investigation as to the existing pathological condition; this, however, leads us into therapeutics, and will be more particularly dwelt upon at another time.

Reverting to Fig. 1, Nos. 12 and 13, the progress of caries in the vicinity of the gum conveys an impression that it is even more insidious than that which commences on the crown surface. In the cervico-buccal region, especially in the molars, caries is sometimes hidden by the festooned edge of the gum, with which it nearly coincides in shape.

To show the extent, or rather depth of the caries, a section of a tooth split between the roots, instead of the usual section, has been made, which exactly fulfils the requirements of the case, and enables me to more clearly depict the encroachment of disease on the pulp. Here we are able to trace the third stage; commencing at or near the gum, decay has extended into the body of the tooth, both laterally and vertically, until the pulp-chamber is penetrated, *vide* Fig. 11, split section of a lower molar: *a*, caries extending below the gum, and touching the pulp-chamber; *b*, pulp-chamber.

FIG. 11.



I wish now to direct attention to the fourth stage, viz., "A broken-down condition of the tooth-structure, complicated with pulpitis and death of the pulp."

This stage involves some of the most interesting examples of restoration, and it has drawn largely on the resources of the dental art.

Not only are these cases complicated in character, but almost every instance presents some variation which requires a special adaptation of means at the hands of the dentist. Gold, excellent as it is as a filling material, does not adhere to the sides of a cavity, but remains mechanically fixed therein, after being forcibly impacted against the surrounding walls. But when the substance of the tooth is wasted, the foundation becomes insecure, and the filling must therefore be fixed to its position by means independent of adjacent lateral support; otherwise, the slightest shock in mastication may result in disaster to the work. Between an extreme condition of instability, and the almost certain fixity attainable in solid walls, various degrees of difficulty are sure to be present; however, by a judicious appropriation of that portion of the tooth that can be saved, and the use of properly-constructed appliances for retention

inserted in the solid dentine, a substitute for the lost tissue may be obtained. These extra attachments, or retaining appliances, are especially demanded in the designated fourth stage.

Fig. 11 illustrates a condition, the continuation of which is further shown in Fig. 12, an exemplification of caries which has destroyed the parietes, and spread itself in every direction, until the tooth is undermined and left with no other support than perhaps a portion of its lingual or buccal side, and portions only of the approximal surfaces. In treating a case of this character, it will be imperative to remove that portion of the crown which is situated immediately over the diseased part of the tooth, as otherwise the pulp-chamber and its divergent extensions might render abortive every attempt to insinuate instruments even of the most pliant and filamentary character.

Figs. 13 and 14 are two views of a lower molar prepared for filling, fourth stage, in which decay originally commenced at the gum. (See Fig. 12). *a*, anchorage in medial region on a step made in the

FIG. 12.



FIG. 13.

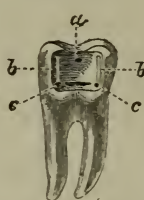
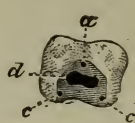


FIG. 14.



angle of the V-shaped part of the cavity; the step being about 1-6 m. below the crown enamel surface; *b, b*, grooves cut from under the enamel extending to anchorages; *c, c*, anchorages on floor of cavity near buccal edge of same; *d*, pulp-chamber.

The cut of this tooth (Fig. 13) showing the prepared cavity, illustrates very plainly the anchorages and grooves and also the position of an anchorage in the medial region. On the floor will be seen the entrance to the root-canals at the point at which they are joined in the lower part of the pulp-chamber. Fig. 14 gives still more clearly the position of the intersection of the united canals by the floor of the cavity.

I have exhibited to you the formation of cavities from the earliest inception of decay, passing through the different stages; also selected instances sufficient to show methods adapted to the various stages of disease. Some have been simple, others difficult of execution, calling for the greatest manual skill. But I shall now describe cases of an exceptional character, that require originality of thought and action quite independent of any teaching or pre-



scribed rules which might govern you in ordinary practice. You will have no precedent, nor will the text-books aid you further than with suggestions in a general way. The treatment carried to a successful issue, however, will result in the establishment of confidence, leading to a position which might not be attained through any other medium.

In my next lecture I shall endeavor to show wherein the gold may not only supply tooth deficiency, but by a system of bracing, enable the frail portions remaining to be protected from shock and consequent fracture, as well as from contact with the fluids of the mouth, or other deteriorating influences.

## IS DENTISTRY A SPECIALTY OF MEDICINE?

BY C. W. STANTON, BUFFALO, NEW YORK.

(Read before the Eighth District Dental Society of New York, April 27, 1881.)

JUST now much is being said and written as to whether or not dentistry is a specialty of medicine. Are we specialists in medicine, and as such, ought we to receive recognition by medical men and associations? As one of the current topics of the day, I introduce the subject here, not that we are to settle it, or because there is special need of settling it, but because it is fitting that we take cognizance of it.

Medicine is the art of preventing, curing, or alleviating the diseases of the human body. This is its full, comprehensive meaning. Its history is as old as our race. In the beginning it was probably strictly empirical, and it remains so yet to a considerable extent; from the nature of the case it can hardly become one of the exact sciences. In the course of time it established schools, developed a literature, adopted theories, and begot an "*esprit du corps*" which, though a vital force, has not always been wisely exercised. As it grew and developed, the magnitude of the field covered, and the study and application necessary for the practitioner became more and more apparent, and the fact was recognized that each one could cultivate only a part of the field.

Thus it is that to-day medicine takes its highest form in specialism. The great majority are still general practitioners, though the highest types are specialists,—surgeons, oculists, aurists, obstetricians, dermatologists, etc. A general practitioner is rarely eminent in any special practice; *per contra*, the specialist rarely amounts to much in general practice. Specialists in medicine are those who make special study of the diseases of certain parts of the body, and confine their practice to the diseases of those parts. Such a practice

is called a "specialty" in medicine; and this brings us to the question, is dentistry such a specialty? It will make the answer easier, perhaps, if we consider what dentistry is. Dentistry is the art of preventing, curing, and alleviating the diseases of the teeth. It is now practiced in all parts of the civilized world. In our own country, especially, its practitioners are to be found in every city and village. The demand for the services of the dental practitioner in most European and American communities is many times greater than for those of the oculist or aurist.

The prevention or alleviation of the diseases of the teeth is an ever-present necessity. Dental practitioners successfully meet this want. This brief statement brings us an answer to the question, Is dentistry a specialty of medicine? Using the term "medicine" in the comprehensive sense—the lexicographer's sense—in which I have used it, there can be but one answer; that dentistry is, in the natural order and fitness of things, a special branch of medicine. But terms often have both a literal and a practical meaning; this term I have used in a literal sense. The practical meaning of the term medicine is that art of preventing, curing, or alleviating the diseases of the body practiced by medical men, taught by medical schools, and accepted by mankind. Its highest expressions are from its delegated bodies, and not from its private members. Any recognition of us as specialists in medicine must be in this practical sense and by these well-recognized authorities. I am of the opinion that such recognition is not desirable now. They cannot consistently give it, and we are not ready to receive it. I cannot escape the conviction that the agitation of this subject, and the discussions which are being had upon it, are prompted, not so much by an earnest desire to improve the practice of dentistry,—to more successfully do the special work that is ours to do,—as by an ambition to acquire position, not so much by our own unaided efforts as by clinging to the skirts of those who are above us.

Holding these views, I may as well be frank enough to say that I should be sorry to see any formal or general recognition of us by any respectable medical body as special practitioners of medicine. Of course it is easy to say that we are engaged in the work of alleviating pain and disease. That is very true, but so are that vast host of domestic practitioners, the wives, mothers, and nurses of the world; but they are not to be called either general or special practitioners of medicine. It is not enough that we have become numerous and respectable; that we occupy socially a good position; that public confidence is ours, and that our ranks contain some of the very best of men. Dentistry is chiefly an art, subservient to theory and directed by it. The most of our work as practitioners

is that of artisans working on living tissues. It is a minority of our cases that call into play any higher skill than that of hand and eye, with such judgment as experience teaches. Such being the fact, is it to be expected that we should be to-day a class of educated men, using the term in any broad sense? Many very good dentists are sadly deficient in this respect. I am not willing to admit that this is a matter of shame and humiliation. Cultivation and refinement are things of time and growth. The pioneers in any new field are not usually noted for culture, but for originality and energy. This might be illustrated from medicine, law, or theology, but illustration is unnecessary, as all will admit, I think, the truth of this statement. Our practice is the development principally of the last half century. The demand has been for men who could do the work required, without regard as to where they came from,—colleges or blacksmith-shops,—where they had been trained, or even how *thoroughly* they had been trained.

The elevation of any particular class of men is the result of a demand on the part of their constituents—the people. The greatest attainments of the pulpit, the bar, the medical fraternity, or in any other field are the result of enlarged conception on the part of their representatives; but that conception has its stimulus in the public demand,—the *vis a tergo*,—the force behind them.

Now that the supply of dentists is sufficient for all necessities, the people are beginning to appreciate the best gifts, the best efforts, and the best results; and now is slowly being illustrated the great law of "natural selection and the survival of the fittest." We have to-day dentists enough in this country to supply all necessities if not another one were added to their ranks for the next ten years. But the number is constantly increasing, and will continue to increase. I am glad this is so. The people will get a better idea of what is best in dentistry in the opportunity for selection. Twenty thousand dentists will educate the people of the United States in dentistry and elevate its standard faster than ten thousand would, and this without regard to the qualifications of the practitioner. Education, either by precept or by bitter and costly experience, will result, thus driving out the incomplete and inefficient. How long before this work will make itself apparent we cannot tell. It may not be accomplished in our day. It will be a very gradual work, and accompanying it, I am very confident, will be the elevation of dentistry, both in theory and practice. When this work shall have been accomplished, dentists will be men of general and professional education. In my opinion, they will be men who have taken a medical degree and supplemented their medical knowledge by special training for special practice.



I give little heed to that considerable class who ask, "What good will it do us to get information outside of our special field?" "How are we to better fill and save teeth for having heard lectures upon Colles's fracture, Bright's disease, or obstetrics?" This same class of inquiries might be made by every specialist. There is not a young man graduating from the classical course of any college but might ask what use his studies would be to him, unless he were about to teach. We all might ask what bearing has a great part of what little we do know upon our special work? Everything that widens the range of one's knowledge and information is a help to us. If every dentist in this country was a graduate from a good literary school, a good medical school, and a good dental school, does any one doubt that the practice of dentistry would be very much better than it is, and its standard very much higher? Some such condition will come when public opinion behind us compels it—not sooner. When it does come, we shall not need to ask for recognition, we shall have been already recognized. We are recognized now as far as it is good for us, and for all that we are worth. I believe medical men are very kindly disposed toward us.

Fifty years since, dentistry found few facilities for education anywhere. It established its own aids without help from medicine; it founded its own schools, and educated and sent forth its laborers. These schools were for special teaching, and their pupils were sent out to supply a special want. The education was practical; the work was to be practical. Now, the field being supplied, we can afford to devote more care to the education of the coming dentist, to make it broader and more comprehensive. We have made ourselves. What we are as dentists and specialists we have become by our own efforts. We owe comparatively nothing to that ancient and worthy fraternity with which some of us are so anxious to be joined. There is no crying need of this help now which can be urged as a reason for asking recognition. The infant may have once needed an outstretched hand, but it was withheld, and it stands alone and secure now.

In the beginning, medical men may have held us somewhat in derision. That was natural; but, as we have shown our worth and ability, they have given us credit and greeting until we are recognized now for all that we are worth. Any more special recognition of us at this time than we have would be an absurdity. Not a tithe of us are educated—in the professional sense. The absurdity of a recognition based on the acquirements of an occasional representative is sufficiently apparent. I question the motive which prompts the asking of any sort of recognition from any local or national medical society more than we have already, until we are

very much nearer an equality in standards than we are at this day. We make a mistake in asking or demanding anything. We do not think more highly of a man because he calls attention to his temperance, honesty, and truthfulness. The virtues of any man are appreciated as they are apparent in his life. The agitation of this question is on the wrong side. It is in our own ranks, instead of in those of the medical fraternity. Let us not be eager to extend our hands, but rather wait for other hands to reach down for us and bid us come up higher.

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## PROCEEDINGS OF DENTAL SOCIETIES.

### NEW YORK ODONTOLOGICAL SOCIETY.

REGULAR meeting held at the residence of Dr. J. Morgan Howe, Tuesday evening, March 15, 1881.

President, Dr. W. A. Bronson, in the chair.

#### INCIDENTS OF OFFICE PRACTICE.

Dr. E. A. Bogue. I hold in my hand part of the minutes of our last meeting. I should like to know from Dr. Bödecker, whether I understood him correctly in asserting that when dentine was once formed there was no subsequent formation of secondary dentine beneath a cavity of decay, save in exceptional instances, and so far as his examination has gone he has met with only two cases of such secondary formation.

Dr. Bödecker. Secondary dentine may of course be formed when decay approaches the pulp-cavity, but I was then referring to decay which had undergone reformation and recalcification.

Dr. Bogue. With the permission of the president, I should like to clear up this subject a little. I see now, by the aid of the minutes, that I could not have been correctly understood by Dr. Bödecker. I understood Dr. Abbott to claim that in the first place he recognized no such thing as the vitreous surface upon dentine; indeed, the minutes state that. In the second place, I understood him to claim that there was no such thing as a deposit of calcific matter in the dentinal tubuli, and I understood Dr. Bödecker to support him in that assertion, or, to give his expression, that there were but two exceptions in his specimen cases; and I understood them both to claim that if there was any deposit of secondary dentine back of any decayed surface, as though it were a barrier set up by nature against decay of the teeth, it was an entirely unusual process, one upon which you could not count and which did not take place behind the wearing of clasps, or after the wearing by attrition.

Dr. Bödecker. Then, I am sorry to say, I did not understand the question, because secondary dentine will form in the pulp-chamber upon external irritation. This is one of the subjects I have studied closely and have written upon in the DENTAL COSMOS.

Dr. Bogue. This evening I found eighteen cases, drawn by Dr. Heitzmann for the Atlas gotten up by Dr. Wedl and himself; in Salter, in John Tomes, and Hulme, I find other cases, all supporting the views which I advanced at our last meeting. After such authority in support of that side of the question, my astonishment at its denial may be imagined. I am glad that Dr. Bödecker did not advance the views credited to him, and I hope Dr. Heitzmann will enlighten all of us upon that one point.

Prof. Heitzmann. Before the commencement of the meeting I thought the whole subject was plain enough. I show the specimens to all classes in my laboratory, illustrating that external irritation caused by anything will produce secondary dentine. I fully agree with Dr. Bogue, if he claims that calcification will produce secondary dentine. That was, however, not the question. What Dr. Bödecker was asked about was the deposition of lime-salts in the primary dentine. That was evidently the question upon which Dr. Bödecker gave the answer, as he wrote an article for the DENTAL COSMOS wherein he stated the different shapes of secondary dentine.

Dr. Bogue. If agreeable to him, will Dr. Heitzmann publicly make the statement he made to me in reference to the formation of secondary dentine?

Dr. Heitzmann. My conviction is that primary dentine, being an accomplished tissue, will not be subject to a new deposition of lime-salts. But if dentine be softened and inflamed, recalcification and solidification of the dentine may take place. If lime-salts be once removed through an inflammatory process, recalcification may occur, which evidently is a process of the greatest importance around the filling of a tooth; in such a case the canaliculi may exhibit a very much smaller size than they do normally.

Dr. Bogue. Will that deposit be at the periphery of the tubuli?

Dr. Heitzmann. It just as well may occur in the midst of dentine.

Dr. Bogue. At any point along the dentinal tubuli?

Dr. Heitzmann. At any point.

Dr. Bogue. That was the question,—indeed, there were two questions. The first pertains to what Dr. Heitzmann has stated so clearly, and for which I beg him to accept my thanks; and the second pertains to the question brought up by Dr. Bödecker. It will be remembered by those who were present at our last meeting, that the question arose from the statement by Dr. Abbott, that he would not in all cases remove all of the decay previous to filling, and I



asked what he called decay, and in the discussion which immediately ensued as to the discolored dentine those two questions arose. With the president's permission, I will read an abstract from Salter, who has been alluded to by both gentlemen.

On page 146 he states: "The calcification of the pulp is a morbid process, though a reparative one. It falls under the category of those many processes, which, evoked by injury or disease, are the means of averting results which would be fatal to the individual organ affected. The process has a close analogy to those many conditions in which irritation and increased vascularity, caused by disease in contiguous structures, issue in the deposition of adventitious matter; in this instance, as usually happens, the nature of the adventitious matter is determined by the normal nutritional affinities of the organ affected. There is a qualitative disturbance of nutrition, resulting from a vascular disturbance which would seem to be merely quantitative."

Tomes, I think on page 310 of his "Dental Surgery," states that nature sometimes performs an operation somewhat analogous to filling, in which the walls of the cavity are broken down, the surface polished by attrition, and there is set up a deposition of secondary dentine which is antagonistic to decay, and which is the natural method of preserving the teeth.

Dr. Dwinelle. I am unfortunate in not having been here at the last meeting; but a hint suggests a question. I think Dr. Bogue stated that Dr. Abbott claimed that he did not, under certain circumstances, remove all the decay of a tooth. Was that the statement?

Dr. Bogue. Yes, sir.

Dr. Dwinelle. I should like to inquire what impression was left upon the meeting in reference to the character of the decay that was left behind.

Dr. Bödecker. If I remember rightly, Dr. Abbott announced that a cavity very rarely, if ever, was perfectly cleared of decay; because, if you examine a decayed tooth under the microscope, you will see that the decay runs down further than you can reach with any instrument; and I believe it is this that Dr. Abbott announced nobody would remove.

Dr. Dwinelle. I think if you go back to the early part of 1840, you will find that it was considered that to expose the pulp of a tooth was to insure its destruction. Though abominable now, it was good doctrine then, and was the practice of a large portion of our profession. At that time, in an article which was published in the *American Journal of Dental Science*, I advocated not removing the last lamina of partially decomposed bone, which, of necessity,

would involve uncovering the pulp, and with it the destruction of that organ. I advocated filling such teeth, and upon examination, years afterwards, I found they were recalcified, having become even harder than normal dentine itself. I was roundly abused for it, and accused of advocating the leaving of decay in the tooth to its detriment and ultimate destruction. In the course of time, however, it became a good doctrine; I believe it is good to-day. Our worthy friend, Dr. Arthur, became so interested in this subject, that he found himself writing a series of articles upon deep-seated dental caries, in which he advocated the same doctrine some ten years afterwards, and he was surprised that I had anticipated him. I have a letter from him to that effect. Dr. Abbott, it seems, referred to the matter at our last meeting, and stated that it is his practice. I should like to inquire at this moment, in the advanced condition of our art, if it is orthodox to assume and claim that such partially decomposed dentine is recalcified? I ask the question because we have with us at this moment a gentleman whom I consider the very highest authority on this subject.

Dr. Heitzmann. The microscope can settle the question before us in a very satisfactory manner indeed. In the large collection of specimens of teeth made by Dr. Bödecker, there were a number exhibiting a deposition of lime-salts around a cavity. I recently demonstrated a specimen to a class, where along the border of a cavity the marks of the instrument and particles of decay were visible—left behind at the time of operation. At the same time a large amount of dentine had newly formed, which is characterized by a certain irregularity in the arrangement of the canaliculi and a much larger amount of basis-substance than primary dentine ever has. Here is the evidence of recalcification, and it is the process to which I alluded before, when I said that if dentine is deprived of its lime-salts and brought in a favorable condition, recalcification will take place. In this case the newly-formed tissue may be much harder than the original. If Dr. Dwinelle advocated that as early as 1840, he certainly was very far advanced in practice. I consider it, from my standpoint, the only legitimate practice.

Dr. Dwinelle. It is sometimes said, "We builded wiser than we knew." This seems to be a case in point. This is a matter of record published in the journals of that day. I will venture to promise to bring the volumes of the *American Journal of Dental Science* containing the articles referred to on this subject, to our next meeting, to substantiate what I have said. I claim that I am not mistaken; that this recalcification was of a denser quality than the normal dentine itself. This I advocated in the early part of the '40's. At that time I also advocated the use of amalgam in certain cases, be-

cause of its hardening effect upon the teeth, though the process is manifestly different. At that early date, I dared advocate amalgam in its better relation, although I am perhaps somewhat distinguished now as an advocate of gold. I referred then to instances where, with old-fashioned amalgam that would turn as black as ink in a very short time, I had filled upon dentine that was exceedingly soft, being deprived of its lime-salts entirely, and that years afterwards I took occasion to go back and take out these amalgam fillings; when, in place of a soft and decomposed dentine, I had found the layer underneath the amalgam filling as black as ink, and harder than dentine, and giving a crepitous sound under the instrument like glass. I did not consider it a calcification, but a kind of fossilization induced by the black oxide thrown off by the amalgam, a sort of embalming process, although I might qualify my opinion on further examination. If I am in error I should like to be corrected.

Dr. Heitzmann. I beg to differ with the doctor. There is no such thing as fossilization or embalming. It is a deposition of lime-salts, richer and more compact than that we meet with in primary dentine. It seems to be of great importance, indeed, what kind of material is put into the cavity, especially with regard to the lime-salts present in a certain tooth. From what I have seen, it seems a bad practice to put strong and heavy gold fillings into temporary teeth, or into teeth which are softer than normal. In such cases the irritation produced by the foreign body may become too intense. Very probably in such cases it is advantageous to use soft fillings, which produce what we want, namely, a circumscribed inflammatory process of the dentine with secondary deposition of lime-salts, resulting in the formation of very hard dentine.

Dr. Dwinelle. I stand corrected. The reason I was led to this conclusion was that the character of the dentine recalcified was so exceedingly different, so hard, so glassy, that I was misled, and as I published in this article, I spoke of it as fossilization. The irritation of the amalgam would partake of the nature of a caustic under the circumstances.

Dr. W. H. Atkinson. This is an interesting subject, and dentists may be divided into two classes; I might say three. The first know nothing about the subject at all; the second know only something about its mass-presentment; and a few have gone far enough to discriminate the processes of transformation of soft or embryonal tissue into the various tissues of the body, especially with regard to the pulp's being converted into dentine and enamel. The subject has to be pronounced first dogmatically, and afterwards serially proved to those who are sufficiently prepared to accept the state-



ments and comprehend what is said. . . . There is a certain amount of lime in the enamel and dentine, which scientists have named "calco-globulin," which cannot be discharged without entirely destroying the tissue. The hardness of the so-called interspaces or basal substance of enamel and dentine is nothing more than infiltration of lime-salts; they are more nearly pure lime-salts. The probability is that we have not gone far enough to enable us to say that these lime-salts have any nitrogen. I wish we had some better term than inflammation for the retrogressive process that constitutes the decay of the dentine in the return to the embryonal condition. Those in authority have often come to the conclusion, inspirationally, as Dr. Dwinelle did, and used the term that answered his necessity to indicate the hardness he found there without going into the intimate relationship of its chemistry, or the activity whereby it was made so much harder than normal dentine. Every man experiences what he says, that it is hard enough to strike fire, when struck against a steel or any very hard substance. That particular kind of retrograde metamorphosis which has been called solution, and has been named by those here to-night inflammation, I want to enter a caveat against indorsing as inflammation, without seeing the first step toward inflammation. I would acknowledge it as inflammatory action, although it may be preparatory to what we understand as inflammation, which is nothing less than the breaking down of formed tissue into its original embryonal condition. Experiments in chemical investigation have been misunderstood. They have talked about activity, reducing it, measuring the quantity of such lime as they have found, without giving us the formula of the change at all. Whatever the retrograde metamorphosis is by which the lime-salts are rendered fluid—not solid in a state of solution—may go on until whatever it was that induced that retrograde metamorphosis has been arrested, has expended its energy; and after that, while the lime-salts are in situ, they may tend to obliterate the canaliculi and the dental fibrils, so that you will have to put the tissue through the process of solution again by some other solvent of the lime-salts, to enable you to detect what was its original character. Where is the evidence of that? These formations have been called globular dentine. Globular dentine is oftentimes referred to as dentine arrested in a certain stage of the conversion of the odontoblasts into dentine; and it has been assumed that it arises from the embryonal tissues that pass through the stages of making these "giant-cells," holding within them a considerable charge of lime-salts, and when they come into that shape, you have this globular dentine with fibrils running across the clear globe-mass, so that you can see through it. I take that as a disturbance of the normal ac-

tivity of molecular change of what there is then going up and down the ladder of construction, which will be revealed as soon as Prof. Heitzmann finds the gentleman he wishes to take hold of it. For this reason, if we have no evidence of any excessive amount of lime-salts being capable of forcing its way into the pulp and discharging into the general circulation, although it has been reduced so, yet if we say there has been in one case a recalcification of decalcified dentine, we must make the statement only that it is *apparently* decalcified; it is not deprived of its lime, but the lime molecules are so dissolved as to render them easily moved; and when we cut that portion of dentine we say it is decalcified, because it is soft and yielding; but the lime is there. That is theory I know, but it is conclusive to every man who is conscientious and watches to arrive at an understanding of what occurs.

It is said that where the pulp is exposed the odontoblasts are taken entirely away, and you will never get secondary dentine to inclose that pulp. That is the general statement. Where it is largely removed, it is true; but where it is not very largely removed, I clip the portion of the pulp at the margin of the exposed point, and allow the pulp-tissue to retract into the pulp-chamber by the discharge of some fluid, then take a fine bur, either in the hand or engine, and trim the sharp edges off and put a non-conductor over it, and get good secondary dentine. This has occurred in my own practice.

Dr. S. G. Perry. So long have I been convinced of the hardening effect of amalgam fillings on young teeth, that for years, in some cases, I have deliberately filled with amalgam, expecting that after a few years I should have a better tooth, which could then be securely filled with gold. Four or five years will sometimes give a consolidation that is surprising.

Dr. Dwinelle. I use tin.

Dr. Perry. Has it the same effect?

Dr. Dwinelle. I am a little afraid of the staining of the amalgam, and so I have used tin.

Dr. Atkinson. Those of you who followed me closely in what I said will recollect that I stated that whatever it is that sets up the retrograde metamorphosis which changes the lime-salts from a solid to a fluid condition, would either be expended or neutralized before recalcification could be set up. The reason of my calling attention to this now is the difference of views of what I understand the subject of observation to be as to the hardening under various kinds of fillings. There is a large field there that is a mechanical field, but I take it that all these cases of recalcified dentine are so apparent to the eye under amalgam that the observers have not discriminated

that this also occurs under other agents, notably oxychloride of zinc, under tin, and especially under those forms of oxychloride or oxyphosphate into which oxide of tin enters largely,—“putty powder,” which we use as an application over a nearly-exposed pulp, because we think it is a non-conductor, filling over it with something that we regard as temporary, and afterward removing it, and having at the last to account for its being calcified; it has been called “vitri-faction” of the dentine. I only say this as a sort of caveat against those who have made up their minds that there are only a few things capable of bringing about this result, and especially that the young men may not feel that there is any one physical body that is capable of setting up this action which we call retrograde metamorphosis.

Dr. Bogue. It seems almost presumption, after what has been last said, to ask further questions, yet I want to ask Dr. Atkinson if he would take exception to the statement that any filling that was a non-conductor of caloric, but which necessitated a certain amount of irritation of dental tissue, might be expected to cause or promote a deposit of secondary dentine under it? If I excavate a cavity, and so irritate a tooth whose pulp is not yet exposed, and fill it with any substance excepting gold,—which is about the best conductor of caloric that is known, unless it be copper,—am I not to expect secondary tissue to be formed under that filling?

Dr. Atkinson. No. If it is a tooth with any large amount of lime-salts in it that are reduced from a solid to a fluid state, there will be recalcification. I do not know what you mean by “irritation,” and if I could understand what you mean by “irritation,” then I should be able to say more clearly what I might suppose about the case; but any filling whatever, that will exclude all foreign substances from the part, will bring about that result. The continued conversion of the odontoblasts into dentinoblasts that gives us this irregular dentine, which we call secondary dentine, is always upon the margin of the pulp-chamber. In good teeth this may be variously expected, but where teeth are of a low character, you will fill them with anything, and have no further change in that regard as far as I know and as far as I fancy.

Dr. Bogue. I accept that statement from Dr. Atkinson, and venture to add another. The filling will simply protect the part underneath, and will not actively *promote* the deposit of secondary dentine, although such deposit may be constantly going on. As to what I mean by irritation, I take Dr. Heitzmann's own words, given a few moments since; and as Dr. Atkinson has acknowledged Dr. Heitzmann to be the first authority in the world in that direction, he ought to know. I am only desirous of properly asking my question.



Dr. Wm. Jarvie, Jr. As I understand this discussion, Dr. Atkinson and Dr. Heitzmann are exactly at variance. I understand Dr. Atkinson to say low-toned teeth—teeth that are lacking in lime-salts—will not become any more densely calcified, no matter what filling material may be placed in cavities of decay. I understood Dr. Heitzmann to say that that is the very class of teeth that might be filled with some such substance as amalgam, and thus get an irritation that would induce a calcification of the dentine. That is, as I understand the two. Did I understand you aright, Dr. Atkinson?

Dr. Atkinson. You did; but the question is this: He was speaking of one thing and I of another. He did not discriminate. He said that was a recalcification, and not secondary dentine. That is all. It might be secondary dentine if you called it secondary dentine at all. Through the kindness of W. C. Barrett, of Buffalo, we have specimens that have proved this question very clearly to our minds.

Dr. Perry. Have I, then, been looking all these years with my eyes shut? Is it true that under amalgam there is not a more rapid hardening process than under other fillings we put in?

Dr. Atkinson. Dr. Dwinelle says he has seen it more frequently under tin than under anything else. . . .

Dr. Perry. What is your opinion, and what is the opinion of other gentlemen?

Dr. Atkinson. I do not care anything about tin.

Dr. Perry. But you say we must judge by our experience.

Dr. Atkinson. We must not make it a judgment until it is right. We are not required to give a judgment upon mere fancy. If we had the truth, we would justify ourselves in the minds of our patients and our own minds, and there is not that man living who loves fancy instead of knowledge for himself.

The Secretary then read the following paper on "Dental Exostosis," by Junius E. Cravens, D.D.S., Indianapolis:

Dental exostosis is an enlargement upon the root or roots of a tooth. It is usually found on and about the apex, but sometimes on the sides and between the roots. In cases of some wisdom-teeth and double-rooted bicuspid, the cementum is found to have enlarged until the mass has enveloped both or all the roots. This is nothing more or less than an extra or secondary growth upon the primary cementum, beneath the pericementum.

*Cause.*—Exostosis on tooth-roots, is due to mechanical circumstances similar to those that promote the primary development of dental cementum. In nearly all cases the cause is simple enough, and rarely exists to the extent of inducing well-marked exostosis in subjects under the age of twenty-five years.

Under the admirable order of creative economy, the teeth of man are designed to enjoy and thrive upon substantial occlusion. Now, if such occlusion has not been realized when the crown is erupted and the roots completed, the crown will be forced onward in search of occlusion by the subsequent development of cementum about the ~~root~~ ~~or~~ roots, and appropriated in such manner as to materially add to the length of each root. As proof of this lengthening, the cementum is found to be much thicker upon the ends of the roots, becoming thinner as it advances toward the crown.

At or after twenty-five years, it is frequently, perhaps generally the case that one or more teeth are without occlusion, which is due to extractions that have occurred.

The orbicular dental ligament is at first sufficiently strong to resist and arrest the advance of the crown, and thus for a time check development of cementum upon the roots of newly erupted teeth. But this ligament will not always continue to hold against wanting or lost occlusion. It is a fact well known to dental practitioners, that teeth that are unused, from whatsoever cause, will become crusted with salivary calculus or tartar. This crust is very tenacious, always harsh and rough, and when in contact with the gum, is a source of constant irritation to that tissue; as a result of such maintained irritation the gum is induced to recede.

At each recession, however slight, of the gum margin, the line of salivary calculus is apt to be promptly reinforced by a fresh deposit that occurs in the almost imperceptible space left by the receding gum; thus go on this cause and effect until the orbicular ligament at that point is obliterated, and we are thus often brought face to face with *pyorrhea alveolaris*, the greatest crime chargeable to the dental profession, and brought about by willful or unskillful destruction of articulation in many instances.

Now, suppose that a tooth has already lost all articulation at the time of the destruction of the orbicular ligament; in such a case (one by no means unusual) the root of the tooth is no longer held with the apical portion firmly applied against the basilar alveolus. This condition favors reassertion of osteoblastema under the pericementum about the apex, and renewal of cemental development at that point is probably assured.

Occlusive and orbicular resistance having been lost, the pericementum is no longer compressed within proper limits, so that the enlargement of the cementum is in a manner untrammelled, and it spreads more or less rapidly and irregularly in any or all directions; and thus we have the distinction of secondary cementum or dental exostosis.

Dental exostosis is not always attended by perceptible ill effects,

nor can it always be successfully diagnosed. It is often attended by facial neuralgia of a most excruciating character. This neuralgic symptom is caused by the gradual strangulation of the pulp-cord by the inward rolling growth of cementum which tends to the constriction of the apical foramen, amounting sometimes to almost obliteration of that opening.

If perchance exostosis should in any instance develop outwardly, entirely and altogether, so that the pulp-cord in passing through the apical foramen would not be encroached upon, it appears to me that cemental enlargement might go on for an indefinite time, as life goes, without causing pain or serious inconvenience to the individual.

*Structure.*—Dental exostosis is developed in laminae circling about the root, and presenting lacunae and canaliculi, very similar to those found in primary cementum. This difference, however, is noted, that the basilar substance is in greater proportion, and the lacunae less regular in arrangement and somewhat larger than in primary cementum.

Dental exostosis is somewhat lobulated in contour, occasionally excessively so; in the latter case great inconvenience is experienced in efforts to extract the roots upon which these lobules are imposed. Exostosis is oftener found upon roots of upper teeth, a circumstance I believe to be due to *gravitation*, which tends to keep the roots of non-articulating teeth slightly loose in their sockets, if in the upper alveolus. The pericementum being thus relieved of proper compression, favors the reassertion of osteo-blastema beneath it, and the consequent deposition of bone-salts about the apices of the roots involved.

*Diagnosis.*—A diagnosis of exostosis—dental—is very difficult and attended by great uncertainty. The following symptoms have been oftenest noted in dealing with patients who afterward proved to have been suffering from enlargement of cementum upon the roots of certain teeth. In cases there is felt a sensation as of fullness or internal swelling of the jaw; tenderness of certain teeth, under percussion, indicating periosteal congestion. Fitful, inconstant neuralgic pains. In extreme cases, and when several teeth of a section are thus affected, the gums may be badly congested, the breath fetid, indicating feverishness; in such instances the tongue is usually coated, showing sympathetic affection of the stomach.

*Treatment.*—In seeking the origin of a tissue or part of an organ, investigation may be simplified often and helped to fruition by first determining the purposes of the tissue or part. A combination of these—the purposes and origin—will often indicate the remedy, if the tissue or part be an abnormal or secondary growth.

Dental exostosis cannot be dispelled, because it is an accomplished



bony structure of great density, and altogether inaccessible. Exostosis, here, is not a disease, strictly, but a physio-pathological condition of the part or organ. Knowing then, the origin, character, and purpose of dental exostosis, we may intelligently seek to stop its further development; to accomplish this, two general methods have been suggested and practiced with greater or less success, viz.: surgery and mechanics.

The former has reference to the extraction or removal of the affected teeth. This is truly the shortest and only absolute method of eradicating exostosis, but is at the same time often the very worst to be resorted to. Eradication is not always necessary nor best; besides, it is necessarily attended by the loss of one or more teeth. Also, it may be found, after the forceps have been used, that *the extracted teeth were not exostosed* at all. In this connection, it should be remembered that there are other causes than exostosis for facial neuralgia. Teeth should not be sacrificed to a mistaken or uncertain diagnosis.

The second or mechanical method of treating dental exostosis, is based on the *cause* of this secondary growth. I have said that loss of occlusion is the most frequent cause of secondary development of cementum; this knowledge ought, of itself, to indicate the more practical means of checking such development. *Remove the cause by restoring good occlusion!* and further development of cementum is precluded.

Occlusion lost by extraction in such cases, can only be restored by mechanical means. In nearly all cases *artificial teeth must be inserted* to supply the places of the lost organs.

By this treatment dental exostosis is not cured, it is only checked, which is all that can be reasonably hoped for.

#### *Discussion.*

Dr. Mills. Here is a lower cuspid tooth which is a case in point. It was removed but a few weeks since from the mouth of a patient who has been suffering from a disease of the nervous system. Some four lower teeth that had caused excruciating pain had been extracted, and were found to be considerably absorbed at the apex.

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NOTE.—Exostosis seldom develops upon other teeth than those that are sound or but slightly decayed. I conceive the philosophy of this to be, that when a living pulp is subject to a great and constant irritation from deep and extensive caries, all, or nearly all, the bone-salts that would otherwise have been utilized in cemental development upon the exterior of the roots, is attracted to the point nearest the greater irritation, and deposited firstly in the tubuli as dentine of obstruction, and secondarily as secondary dentine within the pulp-cavity. This in case of lost occlusion. Exostosis does not develop upon devitalized teeth.—J. E. C.

The patient had been poisoned by being brought under the pressure of some six atmospheres, while working under ground within the caisson of the Brooklyn bridge. He became an invalid, and has been confined to the house for several years. The result of this disease upon some of the teeth has caused no little injury. Why this inflammatory action at the points of these roots? The cementum of this cuspid, as you see, is a good deal hypertrophied. It continued to give very severe pain some three months before it was extracted. Being at class in Dr. Heitzmann's laboratory, I exhibited the tooth, and the question was asked by Dr. Howe if it had an occluding tooth? I answered, it had. Dr. Howe said, Dr. Atkinson offers a Delmonico dinner for such a case. I suggested that we would remind him of the fact and take the dinner. It seemed to be a clear case. In thinking it over, however, it was not long before it occurred to me that the patient had told me he was accustomed to hold his teeth apart, thinking the pain was lessened thereby. And to relieve himself further, he had constructed a gutta-percha cap which he wore upon the tooth. We have not called upon the doctor for the dinner.

Dr. A. C. Hawes. The paper states that exostosis does not occur in a pulpless tooth. If this is true, why not get relief by destroying the pulp, I should like to inquire?

Dr. Atkinson. The statement is utterly unwarranted, as many other statements of the paper are. It may be true, but where is the observation that enables any sound man to make the statement? I will tell you what I do know. I have repeatedly extracted bicuspid teeth that were very much covered with hypertrophy, and that were a source of irritation; and if you wish to see the slabs cut from these teeth, I will be happy to show them to you and give you a talk over them.

Adjourned.

## ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

MEETING held at the office of Dr. Register, April 2, 1881.

Dr. James Truman read a paper on "The Esthetic in Operative Dentistry."\*

Dr. Darby thought there were many truths in the paper. He thought, with the essayist, that large operations in gold in the front teeth indicated lack of taste on the part of the operator. He believed the highest art consisted in concealing art. As we had substitutes for such cases, he believed they should be judiciously used. He

\* This paper will be found at page 337, current number of the DENTAL COSMOS.

would rather have a good pivot tooth nicely mounted, in the front part of his mouth, than a natural tooth, one-half of which had been restored in gold. In the setting of pivot teeth with metallic pivots, he had discarded the use of gutta-percha and now used phosphate of zinc.

Dr. Essig would rather have a pivot tooth or an artificial one on a plate, than a tooth restored with gold in his mouth. He believed in concealing gold wherever possible. He described the method of inserting natural enamel in exposed cavities, setting it with oxychloride and afterward filling around the joint with gold foil. He had an operation of this kind now in his mouth, performed by Dr. Jack twenty-five years ago.

Dr. E. H. Neall. No one objected to a considerable display of gold, either in large labial fillings or in restoring corners of broken teeth, more than he did; at the same time he believed that in certain cases, and especially for young people, a small line of gold showing in one or two of the anterior teeth along their mesial surfaces rather enhanced the beauty of the mouth. Besides being beautiful, it argued care and attention on the part of the person. To him it was an inspiration to see such work, not only because it had taken skill and judgment to perform, but also because of its good taste. To fill such cavities so that the gold will not show, as recommended by some, would necessitate the destruction of the original contour of the tooth and catch the eye as a blemish, whereas the line of gold, would, by its very nature, disarm criticism.

Dr. Register said that when he attended college it was taught and considered the correct thing to have as much gold show as possible; whereas now, he thought the tendency on the part of the profession, as well as the patient, was to have as little in sight as possible. He had lately seen some teeth filled by college students, where much tooth-structure had been cut away and its place supplied with gold, where the original structure might have been preserved. He strongly condemned such practice.

Dr. Tees differed from some of the other speakers, in that he taught his patients that the showing of gold in the mouth was a sign of care taken, and an indication of refinement. He favored artificial crowns in front teeth where they had been broken and the pulp destroyed, and believed that the "Bonwill" crown was the crown of the future. In setting artificial crowns with metallic pivots, he preferred gutta-percha to any of the zinc preparations.

Dr. Darby thought a crown cut off, when broken, and replaced with an artificial one the safest, best, and most durable operation for such cases.

Dr. E. R. Pettit had such a horror of wearing a plate that he



would rather have his front teeth built up with gold, if they needed it, than wear an artificial substitute.

Dr. Essig alluded to the fact that certain men were endeavoring to increase the use of plastic fillings, especially amalgam, and had gone so far as to practice the filling of the front teeth with this material. He felt that the influence of such teaching must necessarily be bad upon the young men entering the profession.

Dr. James Truman said that extremes beget extremes. The natural result of the practice and teaching of men who confine their operations to the use of gold, was to create an opposition party who would not use it at all, but would go to the other extreme and use plastics only. He thought both were wrong, and that a certain conservatism should be both taught and practiced. He was convinced from what he saw and heard during his residence abroad, that the teachings of the "New Departurists" had done great harm there, and he had no doubt an equally bad effect would be felt here.

Dr. Guilford said that he could never identify himself with either party of extremists, for he had always been conservative in his feelings. At the same time, he was willing to believe that both parties would accomplish considerable good in their respective ways; the one by inviting to greater care and skill in the use of gold, and the other by leading to improvement in the preparation and manipulation of the various plastics.

Dr. E. R. Pettit favored the use of plastics in very many cases, and said that if we were paid more, we could afford to use gold more.

Dr. James Truman thought that in cavities in the upper third of the labial surfaces of superior incisors, he would prefer phosphate of zinc to gold, on account of harmony of color, even if he had to renew the operations occasionally.

Dr. Dixon generally preferred gold in such cases, as in others of like importance, for the reason that he wished to make each operation as perfect and enduring as possible.

Dr. Truman spoke of the use of tin foil at the neck, with the rest of the filling of gold in approximal cavities in the bicuspid and molars. He also described the plan of using tin and gold foil rolled together, as originally practiced by Dr. Abbot, of Berlin. He said the latter filling, although it became discolored, also grew very hard through some chemical change, and its tooth-preserving qualities were quite remarkable.

Dr. Register described the plan of his brother of coating cavities, after their preparation, with liquid gutta-percha, and then filling with amalgam. The expansion of the amalgam in setting simply made a better joint by compressing the gutta-percha against the walls.

Adjourned.

## AMERICAN DENTAL ASSOCIATION—SPECIAL NOTICE.

THE next annual meeting of the American Dental Association will be held in Irving Hall, corner of Irving Place and Fifteenth Street, New York City, commencing at 10 o'clock A.M. on Tuesday, July 12, 1881.

GEO. H. CUSHING, *Recording Secretary.*

As to the expediency of the change of time of the meeting of the association, as above announced, consultation was had with as many of the members of the association, by letter and otherwise, as the limited time would permit; and from information thus obtained, it was believed that the best interests of the association would be subserved, and the wishes of a large majority carried out, by antedating the time of meeting to the twelfth of July.

The principal reason for this change lies in the fact that a large number of the permanent working members have already made arrangements to attend the Medical Congress, to be held in London at the usual time of the meeting of the association, many of whom, we are informed, would attend our meeting at this earlier date. Believing that the number of members in attendance would be very much larger by this arrangement, and the meeting more generally satisfactory, the officers and Executive Committee, after much deliberation, have assumed the responsibility of calling the association together as announced above.

C. N. PEIRCE, *President.*

GEO. H. CUSHING, *Secretary.*

W. H. GODDARD, *Treasurer.*

J. N. CROUSE, *Chairman.* GEO. W. KEELY,

W. H. MORGAN, S. G. PERRY,

C. N. PEIRCE, CHAS. D. COOK,

C. S. STOCKTON, G. V. BLACK,

*Executive Committee.*

The local Committee of Arrangements would recommend the Westminster Hotel, corner of Sixteenth Street and Irving Place, as a very quiet and good hotel, and as being in close proximity to the place of meeting. They have reduced the price from their regular rates of \$3.50 to \$2.50 per day.

If any members desire to secure rooms, and will write, the Committee will secure them.

A. L. NORTHROP, 44 West 46th Street.

W. H. ATKINSON, 41 East 9th Street.

GEORGE A. MILLS, Brooklyn.

*Committee of Arrangements.*

**DENTAL ASSOCIATION OF THE UNITED STATES OF AMERICA.**

THE regular annual meeting of the Dental Association of the United States of America will be held in New York City, commencing Monday, August 8, 1881.

This association was organized, not in opposition to those already existing, but to supply a want that is not met by any one of them. It is so constructed that members of the profession in all parts of the country can, in turn, attend its meetings and participate in its control and its benefits.

Article III., Section 1, of the Constitution, says:

"The future membership of this association shall be composed of dentists who may be elected upon application, which application shall be accompanied by credentials of membership in a State society, or by a recommendation from five members of this association or of the State society of the applicant."

All members of the profession are therefore cordially invited to attend this meeting.

R. FINLEY HUNT, *Secretary*, Washington, D. C.

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**SOUTHERN DENTAL ASSOCIATION.**

THE thirteenth annual meeting of the Southern Dental Association will be held at Asheville, North Carolina, on Tuesday, July 26, 1881.

The North Carolina Dental Association meets at the same time and place, which will greatly contribute to the interest of the occasion and the number present. All dentists are cordially invited to be present. Favorable arrangements have been made with hotels and railroads for reduced rates.

E. S. CHISHOLM, *Recording Secretary*.

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**PITTSBURG DENTAL ASSOCIATION.**

AT the seventh annual meeting of the Pittsburg Dental Association, the following officers were elected for the ensuing year:

*President*.—Dr. W. F. Funderberg.

*Vice-President*.—Dr. H. Morrison.

*Secretary*.—Dr. H. W. Orr.

*Treasurer*.—Dr. F. A. Reinhart.

*Censors*.—Drs. J. Finney, C. W. Beacom, and W. H. Funderberg.

*Examining Board*.—Drs. J. Finney and H. Manchester.

*Dental Intelligence*.—Drs. F. A. Reinhart and W. H. Funderberg.

*Executive Committee*.—Drs. C. E. Diehl, J. S. Goshorn, and W. A. Lee.

H. W. ORR, *Secretary*.



## WISCONSIN STATE DENTAL SOCIETY.

THE eleventh annual meeting of the Wisconsin State Dental Society will be held at Milwaukee, Wis., commencing Tuesday, July 19, 1881. Members of the dental and medical professions are cordially invited to attend.

M. T. MOORE, *President.*

EDGAR PALMER, *Chairman Executive Committee.*

## NORTH CAROLINA STATE DENTAL ASSOCIATION.

THE seventh annual session of the North Carolina State Dental Association and the thirteenth annual meeting of the Southern Dental Association will be held conjointly, in Asheville. N. C., commencing Tuesday, July 26, 1881. The State Board of Dental Examiners will meet at the same time and place. All dentists interested in the progress of dental science are cordially invited to be present.

W. H. HOFFMAN, *Secretary.*

## PENNSYLVANIA STATE DENTAL SOCIETY.

"POINT CHAUTAUQUA," about fifteen minutes, by boat, from Mayville, New York, has been selected as the place for our annual meeting. Mayville and Jamestown, at opposite ends of the lake, are easy of access by railroad, and boats furnish means of ready transit to the Point, where the Grand Hotel will accommodate all who come.

Members and delegates who do not receive railroad orders for tickets at excursion rates, can procure them by inclosing a three-cent stamp, with address, to E. B. Long, Corresponding Secretary, Pittston, Pa. By order of

EXECUTIVE COMMITTEE.

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EDITORIAL.

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INTERNATIONAL MEDICAL CONGRESS.

As our readers are aware, from the circular published in the April number of the DENTAL COSMOS, the meeting of the International Medical Congress takes place this year in London, England, from the 3d to the 9th of August. The sessions will be held in the halls of the University of London and at Burlington House. Several prominent American dentists have gone abroad this season, and others are going, who will attend the meetings of the Congress, especially the sessions of Section XII., on Dentistry. Among them

are a number of Philadelphia dentists, and a considerable number from New York and other sections of the country. We shall have a report of the dental section for our journal.

### DENTAL LEGISLATION.

BELOW will be found the text of two new acts concerning the practice of dentistry.

The Illinois bill is the outcome of a dozen years of effort to secure the passage of a law for the governance of practice and the protection of the people against quackery. In several features it will be found to differ materially from any of the acts in force in States having legislation on the subject.

**"A BILL FOR AN ACT TO INSURE THE BETTER EDUCATION OF PRACTITIONERS OF DENTAL SURGERY, AND TO REGULATE THE PRACTICE OF DENTISTRY IN THE STATE OF ILLINOIS.**

*"Be it enacted by the People of the State of Illinois represented in the General Assembly :*

**"SECTION 1.** That it shall be unlawful for any person who is not at the time of the passage of this act engaged in the practice of dentistry in this State to commence such practice, unless such person shall have received a diploma from the Faculty of some reputable dental college, duly authorized by the laws of this State, or of some other of the United States, or by the laws of some foreign country, in which college or colleges there was at the time of the issue of such diploma annually delivered a full course of lectures and instructions in dental surgery: *Provided*, that any person removing into this State, who shall have been for a period of ten years prior to such removal, a practicing dentist, and *Provided, also*, that any person holding the diploma of Doctor of Medicine from any reputable medical college, shall be entitled to practice dentistry in this State, upon obtaining a license for the purpose as hereinafter provided; and nothing in this act shall be construed to prohibit any physician or surgeon from extracting teeth.

**"SEC. 2.** A Board of Examiners, to consist of five practicing dentists, is hereby created, whose duty it shall be to carry out the purposes and enforce the provisions of this act. The members of said board shall be appointed by the Governor.

"The term for which the members of said board shall hold their offices shall be five years, *except* that the members of the board first to be appointed under this act, shall hold their offices for the term of one, two, three, four, and five years respectively, and until their successors shall be duly appointed.

"In case of a vacancy occurring in said board, such vacancy shall be filled by the Governor.

**"SEC. 3.** Said board shall choose one of its members President, and one the Secretary thereof, and it shall meet at least once in each year, and as much oftener, and at such times and places, as it may deem necessary. A majority of said board shall at all times constitute a quorum, and the proceedings thereof shall at all reasonable times be open to public inspection.

**"SEC. 4.** It shall be the duty of every person who is engaged in the practice of dentistry in this State, within six months from the date of the passage of this

act, to cause his or her name and residence or place of business to be registered with said Board of Examiners, who shall keep a book for that purpose; and every person who shall so register with said board as a practitioner of dentistry, may continue to practice the same as such, without incurring any of the liabilities or penalties provided in this act.

"SEC. 5. No person whose name is not registered on the books of said board as a regular practitioner of dentistry, within the time prescribed in the preceding section, shall be permitted to practice dentistry in this State until such person shall have been duly examined by said board and regularly licensed in accordance with the provisions of this act.

"SEC. 6. Any and all persons, who shall so desire, may appear before said board at any of its regular meetings and be examined with reference to their knowledge and skill in dental surgery, and, if the examination of any such person or persons shall prove satisfactory to said board, the Board of Examiners shall issue to such persons, as they shall find from such examination to possess the requisite qualifications, a license to practice dentistry in accordance with the provisions of this act. But said board shall at all times issue a license to any regular graduate of any reputable dental college without examination, upon the payment by such graduate to the said board of a fee of one dollar. All licenses issued by said board shall be signed by the members thereof and be attested by its President and Secretary; and such license shall be *prima facie* evidence of the right of the holder to practice dentistry in the State of Illinois.

"SEC. 7. Any member of said board may issue a temporary license to any applicant, upon the presentation by such applicant of the evidence of the necessary qualifications, to practice dentistry, and such temporary license shall remain in force until the next regular meeting of said board occurring after the date of such temporary license, and no longer.

"SEC. 8. Any person who shall violate any of the provisions of this act shall be liable to prosecution before any court of competent jurisdiction, upon information or by indictment, and, upon conviction, may be fined not less than twenty-five dollars, nor more than fifty dollars, for each and every offense. All fines recovered under this act shall be paid into the common school fund of the county in which such conviction takes place.

"SEC. 9. In order to provide the means for carrying out and maintaining the provisions of this act, the said Board of Examiners may charge each person applying to or appearing before them for examination for license to practice dentistry, a fee of two dollars, and out of the funds coming into the possession of the board from the fees so charged, the members of said board may receive as compensation the sum of five dollars for each day actually engaged in the duties of their office, and all legitimate and necessary expenses incurred in attending the meetings of said board. Said expenses shall be paid from the fees and penalties received by the board under the provisions of this act. And no part of the salary or other expenses of the board shall ever be paid out of the State Treasury. All moneys received in excess of said *per diem* allowance, and other expenses above provided for, shall be held by the Secretary of said board as a special fund for meeting the expenses of said board, he giving such bond as the board shall from time to time direct. And said board shall make an annual report of its proceedings to the Governor, by the fifteenth of December of each year, together with an account of all moneys received and disbursed by them, pursuant to this act.

"SEC. 10. Any person who shall be licensed by said board to practice dentistry



shall cause his or her license to be registered with the county clerk of any county or counties in which such person may desire to engage in the practice of dentistry, and the county clerks of the several counties in this State shall charge for registering such license a fee of twenty-five cents for each registration.

"Any failure, neglect, or refusal on the part of any person holding such license to register the same with the county clerk, as above directed, for a period of six months, shall work a forfeiture of the license, and no license, when once forfeited, shall be restored, except upon the payment to the said Board of Examiners of the sum of twenty-five dollars, as a penalty for such neglect, failure, or refusal."

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The New York act is additional to legislation already had on the subject.

**"AN ACT FOR THE RELIEF OF CERTAIN PERSONS ENGAGED IN THE REGULAR PRACTICE OF DENTISTRY IN THIS STATE.**

*"The People of the State of New York, represented in Senate and Assembly, do enact as follows:*

"SECTION 1. Any person who was engaged in the regular practice of dentistry within this State on the twentieth day of June, eighteen hundred and seventy-nine, and who was entitled to registration as a dentist, as provided by the third section of chapter five hundred and forty of the laws of eighteen hundred and seventy-nine, entitled "An act to regulate the practice of dentistry in the State of New York," but who failed to cause his name to be registered as therein provided, and who shall make and file with the clerk of the county in which he registers, his affidavit to the effect that he was so engaged in such practice of dentistry and so entitled to registration, may, within sixty days after the passage of this act, cause his name, office, and post-office address to be registered in the county clerk's office in the manner provided in said third section of said act, and such registration shall have like force and effect as if made within the time prescribed by said section of said act. Any person who shall willfully make and file a false affidavit for the purpose of procuring such registration shall be subject to conviction and punishment for perjury.

"SEC. 2. Every person hereafter authorized to practice dentistry within this State shall, before commencing to practice, register in the clerk's office of the county where he intends to commence the practice of dentistry, in a book to be kept for that purpose, his name, office, and post-office address, together with the name of the society, college, or other authority from which he has received his diploma or certificate of qualification to practice dentistry.

"SEC. 3. The clerk of any county shall be obliged, upon the payment to him of the sum of twenty-five cents, to make the registry of any person provided for in the second section of this act, which sum the clerk is entitled to collect and receive from the person registering.

"SEC. 4. This act shall take effect immediately."

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We have also received the text of an act passed by the Legislature of Alabama, which will appear in the August number of the DENTAL COSMOS.

## BIBLIOGRAPHICAL.

THE DISEASES OF CHILDREN: A Practical and Systematic Work for Practitioners and Students. Second Edition, re-written and much enlarged. By WILLIAM HENRY DAY, M.D., M.R.C.P. Philadelphia: Presley Blakiston. 1881.

The author of the volume before us brings to the topics which he discusses the results of an extended private and hospital practice, and the book affords evidence throughout of large clinical experience. The work is arranged in such a manner as to prove useful both to the student and the practitioner. For the use of the student, diseases and their varieties are classified after the method sanctioned by modern pathologists. For the practitioner, each chapter is prefaced with a descriptive heading, so as to enable him to obtain readily the information he seeks.

The author evidences a comprehensive knowledge of the literature of his subjects. A valuable feature of the book is the large but judicious presentation by extracts from standard and current writings of the views of others.

In fifty-three chapters, diet, hygiene, remedial agents, and the diseases, acute and chronic, peculiar to childhood are considered. The style of the author is clear and intelligible, and the work seems to have been written with much care. The publisher's part of the task has been well performed.

DYSPEPSIA: How to Avoid It. By JOSEPH F. EDWARDS, M.D. Philadelphia: Presley Blakiston. 1881.

This is a little volume of eighty-six pages, devoted to a plain and sensible discussion of the cause and cure of indigestion. In four chapters, entitled "Food," "Digestion," "How to Cook Food," "How and What We Ought to Eat," the author gives much valuable information and practical advice, the observance of which would add much to the health and comfort of those who are suffering from derangements produced by improper eating.

TRANSACTIONS OF THE PENNSYLVANIA STATE DENTAL SOCIETY FOR 1879 AND 1880.

The transactions of the eleventh and twelfth annual meetings of the Pennsylvania State Dental Society, for the years 1879 and 1880, are here combined in a very neat pamphlet of 145 pages, which contains the minutes, addresses, essays, etc., of each meeting, in an orderly arrangement. The paper and printing may be said to be exceptionally good.

## OBITUARY.

## DR. WILLIAM FISHBOUGH.

DIED, in Brooklyn, N. Y., May 21, 1881, Dr. William Fishbough, in the sixty-eighth year of his age.

Dr. Fishbough met an accidental death when returning to his home on the evening of the above date, from a fall at his own doorstep, his head striking the edge of a stone, which fractured his skull. He was not only a dentist of long standing in Brooklyn, and of much skill, but a man of considerable and varied intellectual and literary attainments, having spent his life in severe mental studies. He was the author of many philosophical articles in the magazines and newspapers, had published several books, and left, at his death, the manuscript of a scientific and historical work, entitled "The End of the Ages." He was for many years a clergyman of the Universalist Church, and was always interested in and gave much attention to questions of reform. Dr. Fishbough was a man of singular modesty and rare excellence of character, had scarcely an enemy, and will be kindly remembered by all with whom he was associated.

## ENOS G. ROY, D.D.S.

At a meeting of the First District Dental Society, on June 7, a committee was appointed to express the sentiments of the society in regard to the death of Dr. E. G. Roy, who prepared the following for publication, and also to be presented to the family of deceased:

"It is with feelings of unfeigned regret that we announce the death, on May 20, 1881, of our esteemed member and co-worker, Dr. Enos G. Roy, whose death was caused by an attack of spinal meningitis, following an illness from malarial fever.

"Dr. Roy was fifty years of age; had been in practice twenty-nine years in this city; was one of the incorporators of the New York College of Dentistry; received the diploma of the Pennsylvania Dental College in 1867, and for some time had held the office of Librarian of the Odontological Society of this city, and was formerly Treasurer of that, and likewise of this society.

"Dr. Roy had many characteristics which were calculated to make him successful in the profession; kind-hearted, faithful, and conscientious, he could always be depended upon, a fact which his extensive practice fully demonstrated.

"It is especially gratifying to be able to say of Dr. Roy that whatever duties or responsibilities were undertaken by him in society work, were most faithfully performed to the entire satisfaction of all.

"He was, indeed, an exemplary Christian gentleman, whose many virtues it would be well for us all to imitate.

"W. H. ATKINSON, *President*.

"G. W. WELD, *Secretary*."



## DR. JAMES M. SURGISSON.

DIED, at Wheeling, W. Va., May 25, 1881, of pyæmia, Dr. James Madison Surgisson, in the sixty-fifth year of his age.

DR. SURGISSON'S illness had been of about four months' duration at the time of his decease. He was born in Lancaster County, Pa., September, 1816. In his early days he resided in Philadelphia, where he became connected with dentistry, the practice of which he followed for over forty years. For many years he had resided and practiced in Wheeling, W. Va. Dr. Surgisson was an efficient dentist and conscientious man, being much esteemed in the profession and in the community where he resided.

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PUBLISHERS' NOTICE.

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THE Trustees of the late Dr. Samuel S. White have, in accordance with the provisions of his will, merged their entire interest in the DENTAL COSMOS, as well as in the business of the house generally, in a stock company, incorporated under the laws of Pennsylvania, and to be known as "The S. S. White Dental Manufacturing Company." The present number of the journal is issued under the auspices of the Company, the transfer taking effect July 1, 1881. We beg to return our thanks to those who have aided us by contributions and subscriptions, and to request for the new organization a continuance of their favors.

JAMES W. WHITE,  
J. CLARENCE WHITE, } *Trustees.*  
HENRY M. LEWIS, }

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The S. S. White Dental Manufacturing Company will continue from this date the publication of the DENTAL COSMOS, and will fulfill to subscribers all the obligations of the Trustees of Dr. S. S. White, whose successor it has become.

The journal will continue under the editorship of Dr. J. W. White, and neither pains nor expense will be spared to maintain for it the position which it has so long held.

THE S. S. WHITE DENTAL MANUFACTURING CO.

## PERISCOPE.

WE copy the following comprehensive chapter on Dental Therapeutics from the recent edition of Dr. Garretson's "Oral Surgery."

—ED. DENTAL COSMOS.

**DENTAL THERAPEUSIS.**—A carious tooth is to be saved through the character rather than by the quality of a plug. The expression of gold is one of compatibility with dentine; that only. It is a substance wholly without therapeutic meaning, save as such meaning lies in an ability to protect an exposed weak surface against external agents of offense. Teeth made up of solid, resisting stroma will be well treated if invariably filled with gold. Preference assuredly is to be given this metal in instance of every individual case. *ceteris paribus*, where a plug is to show. It is also to be given where elegance and purity of expression come at all into consideration. In a word, it is desired to have understood that the teachings of this volume favor the employment of gold as a tooth-filling material whenever and wherever not contraindicated. It is as well desired to have plainly expressed the view, that fully one-half the operative dentistry of the day differs in no respect from a jeweler's work.

To be able to fill a tooth solidly and beautifully with gold, especially as contouring is concerned, is to have achieved a very creditable accomplishment; it is not, however, to have learned anything scientific. What is done is not half so difficult as things being accomplished every day by workmen who think nothing at all of what they do.

Operative dentistry is not special surgery: it is art, not science. In this respect Oral Surgery is of little relation with dentistry; that art being viewed as a profession whole in itself.

Whoever would treat and fill a carious tooth in relation with the laws of surgery, is to treat and fill it in relation with indications. A filling of gold is an inert filling; it does nothing but stop a hole. Removal of a thoroughly well-made plug of gold, which has remained in relation with a cavity intact for many years, shows no change in the parietes of the cavity; the part remains as when brought in relation with the metal.

Other materials brought in contact with the parietes of a cavity in a vital tooth are found on removal to show changes; these have stopped holes, they have as well worked therapeutically.

A first consideration, as reference is had to selection of a tooth-filling material, may be instanced as referring to thermal conductivity. With some, with a great many teeth, such conductivity means nothing; with others, a great many others, it means inflammation of a pulp.

Gold is the most marked among the tooth-filling materials as a conductor. Where irritation is contraindicated, the metal is not judiciously to be used except in combinations. Where a cavity is large or a pulp nearly exposed, non-conducting substances are to underlie plugs made of gold; otherwise, plugs are to be made of other materials.

Teeth are found where gold is unsuitable because of its density;

a soft tooth filled with cohesive gold, the mallet having been used, is oftentimes felt by the patient as possessed of a stuffed feeling; the discomfort being so great as to compel removal of the mass.

The opposite of gold, conductivity being considered, is gutta-percha. Judgment plays the one against the other.

Soft teeth are most surely to be saved by a prophylaxis that considers a re-excitation of the calcification lying in the dental pulp. Agents used with this intent, named in the order of the excitant quality possessed, are chloride of zinc, copper, tin.

To recalcify a tooth means to harden it. To harden the parietes of a cavity of decay, means to render the tooth resistive of external influences. Calcification arises out of judicious stimulation of a pulp; over-stimulation changes excitation to degeneration: defeats and perverts, consequently, the result of an intention.

To judiciously use oxychloride as a filling-material, is to possess measurement of the wants of the tooth to be filled. A majority of teeth can be recalcified. What, however, proves the equitable stimulation of one is over-stimulation to another. It is not to be denied that the chloride of zinc has destroyed more pulps than it has calcified teeth. No rule resides in the measurement of its use; proper employment of the agent lies in deductions arising out of experience.

In over-excitabile teeth gutta-percha takes the place of the zinc chloride; or, in instances, the floor of a cavity may be covered with it, or with a layer of oxide of zinc, and the oxychloride placed upon this. Where gutta-percha is used, the red variety is to be preferred.

Where gutta-percha is selected as a material for a foundation, it is not infrequently to have incorporated with it most advantageously, fine filings of copper; or, dust of the metal may be spread over the floor of the cavity and the gum used to hold it in place. Tin filings apply admirably in the same direction.

Oxide of tin, found in connection with all tin plugs, is a reliable medicament as the calcific process is concerned. Teeth from which the finest made gold plugs fall away by reason of secondary decay, are restored to integrity through the use of tin. As a rule, all children's first teeth, and all soft teeth, are filled safely where tin is the agent employed. In many cases the removal of gold plugs and the refilling of the teeth with tin foil results in the preservation of a denture. After recalcification the tin is to be replaced with gold.

The progress of secondary calcification is to be measured by the occasional removal of a therapeutical plug. If it be found that the process is not advancing with sufficient sureness or rapidity, opportunity is afforded to remedy the default in the application.

Electrical disturbance is to have consideration. Viewing the matter apart from unsettled theories, it is undeniably the fact that a plug made of gold or amalgam, more particularly of the former, quickly becomes imperfect at a point where metal, gum, and tooth associate. Where, in filling such teeth, dryness was secured, the explanation of the deterioration is to be assumed as lying apart from original defect in manipulation. Such teeth are saved by making a neck plug of gutta-percha: after this tin best applies.

Amalgam made with cadmium as a component, when used in a tooth, induces a condition of the pulp analogous to albuminoid de-



generation. On the contrary, admixture being made with copper, the result is so peculiarly tonic, that subsequent years will not unlikely show the pulp contracted to a thread, this arising out of the physiological effort made at calcification.

A concluding reference is to be made to the use of agents acting as parasitocides. No tooth is prepared for any, save an oxychloride, plug until a fungus-destroying application has been made to the cavity to be filled. Teeth of loose structure most particularly are infected with parasites. These are to be eradicated, for these it is which conduce much to leakiness, which leakiness, in its turn, has related with it the meaning of tooth- or plug-decomposition. Such decomposition being resultant of a battery made by the juxtaposition of two solids and a fluid.

As a parasiticide, creasote most conspicuously recommends itself. It is to be used with every plugging material save those containing zinc chloride, this last being an agent of the same import. A cavity thoroughly saturated with creasote is rendered clear of all fungi.

**LARGE RANULA, ACCOMPANIED BY A TUMOR WHICH OCCUPIED THE WHOLE FLOOR OF THE MOUTH.**—The communication which I bring before the society will be very brief, and will merely detail the history and treatment of a case most interesting and unusual.

A. G. was admitted under my care into the City of Dublin Hospital on the 19th of October, 1879 (recommended by my friend, Dr. Chas. Lyster, of Kilkenny), suffering from a large ranula, complicated with a tumor occupying the floor of the mouth. The usual signs of ranula were present, better marked, however, than the generality of cases. A tumor about the size of a Seville (bitter) orange was evident beneath the symphysis menti, the tongue was raised at its extremity, and the entire under surface pushed up by the tumor before alluded to. As far as I could ascertain from the patient, the ranula was of about one year's duration, but she was not aware of the existence of the second growth. Careful manipulation showed the tumor and ranula to be quite distinct; indeed, the appearance caused by the latter beneath the chin gave one the idea that a calculus was obstructing "Wharton's duct." On the 28th of October I excised a piece from the cyst of the ranula beneath the tongue; glairy fluid flowed, and after a time about a teaspoonful of dark thin fluid came; pressure on the swelling beneath the inferior maxilla caused an increased flow, and all signs of the ranula disappeared. Notwithstanding that a large piece of bone was removed from the ranular cyst, it filled again, its closure being favored by the pressure of the tumor from behind. My intention now was to cure the ranula, and remove the cyst occupying the floor of the mouth at the same operation.

On Sunday, the 16th of November, I saw the girl at 11 o'clock A.M. She was in her usual health; the swelling beneath the chin was not quite so large as when she was admitted; she ate her breakfast and dinner as usual, and attended her place of worship,—in fine, in her usual health. At 8.30 P.M. on this evening I was summoned to see her, and arrived at the hospital about nine o'clock. She was suffering from intense dyspnoea, her eyes starting from her head, countenance anxious and distressed, cold perspiration on her face and body. Sitting up, she grasped the bedclothes like one suffering from asthma;

her tongue was enormously enlarged, and pushed upward and backward; both tumors had increased enormously in size; her pulse was rapid and weak; and one unaccustomed to such scenes would have said dissolution was near at hand. Dr. Batt, medical resident, in the absence of the house-surgeon (Mr. Patten), made an incision in the dorsum of the tongue, on the left side. On my arrival I made another on the right of the raphe. This did not give much relief. I then rapidly opened up the cyst of the ranula beneath the tongue, and made an incision into the enlargement externally. From both fluid escaped. Much benefit was derived from this; and next I ripped open on each side the tumor beneath the tongue, and scooped out some of its contents. This gave great ease to the patient, and, being now able to feel the epiglottis, which was œdematous, I scored it with a small curved knife. The patient had poultices and warm fomentations applied; she also inhaled steam; and now, for the first time since she was so urgently attacked, was she able to swallow about half a teaspoonful of milk, the most of the liquid returning when she attempted to do so. Nutritive enemata were given, and she got some sleep during the night. The next day, not being as much benefited as I expected, I opened into the floor of the mouth from without, and evacuated the remainder of the contents of the tumor beneath the tongue, which was of a cheesy consistence. There was some hemorrhage, which was controlled. Mr. Tufnell was present and assisted, as also Mr. Patten, the late house-surgeon, and Mr. Ashe, his successor.

On the next morning I removed a considerable portion of the cyst through the external opening and through the mouth. Suffice it to say, this case terminated in complete cure. She left the hospital on the 5th of December, 1879.

I have epitomized this paper purposely, and not gone into any description of acute ranula, which possibly the case might have been mistaken for had it only been seen for the first time. I have seen two cases of acute ranula, the most urgent symptoms coming on within an hour and a half, the patient being in perfect health two hours before the most distressing dyspnœa supervened. The only case recorded which seems to me at all to resemble the above is one described by the late Sir Wm. Fergusson in his "Practical Surgery."—*W. I. Wheeler, M.D., etc., before the Surgical Society of Ireland, Medical Press and Circular.*

**ON OPERATION FOR RANULA.**—As is well known, there exist many methods of operation for the cure of ranula, none of them, however, except total extirpation, accomplishing the object in view. Neither simple puncture, followed by the injection of irritating fluids, partial extirpation, with or without cauterization of the portion of the tumor remaining, the introduction of a seton, nor packing with lint, etc., insures exemption from relapse.

Some months since, there came under my observation a large ranula which was very prominent on the external cervical aspect. I operated in a manner similar to that suggested by Volkmann for radical extirpation of hydroceles. The tumor was situated beneath the tongue, on both sides of the frænum, by which it was separated into a smaller right and larger left portion; the latter extended



back as far as the last molar, and downward toward the left side of the neck, where it formed a tumor larger than a hen's egg beneath the integument, which was by no means tense, and could readily be thrown into folds. Fluctuation was present both in the cervical and buccal tumors.

The patient, Frau K., of B., twenty-one years of age, about a year ago first noticed a slight swelling in the mouth, to which, however, at first, she paid but little attention. Later, as it increased in size, she consulted her physician, who punctured it, and it gave exit to a yellowish, viscid fluid. The swelling disappeared, but before she reached home, a distance of about one and a half miles, the tumor again filled up. Puncture was then repeated several times, without, however, effecting a cure; on the contrary, the swelling increased in size, and a second made its appearance on the exterior of the neck, gradually assuming its present dimensions.

The operation already indicated was now performed in the following manner: Having first divided the integument and the platysma myoides over the prominence of the tumor to the extent of about six cm., I excised an oval-shaped portion of the exposed cyst about four cm. in width at its broadest point (the viscid, colloid contents being, of course, discharged), and afterward fastened the wall of the cyst all around to the integument by means of silk sutures. In the mouth I operated in a like manner over the site of the swelling, which had now collapsed, and united the margins to the buccal mucous membrane by catgut sutures. Then inserting a drainage-tube of the diameter of the little finger, which I secured in place by similar sutures, I injected through it a three per cent. solution of carbolic acid; finally, I covered the cervical wound with a salicyl cotton dressing. The above solution was employed to wash out the cyst daily, and on the eighth day the drainage-tube and silk sutures were removed. Within about a week the wound closed completely by suppuration, leaving only a small contracted cicatrix. The walls of the cyst, brought into contact, had united by adhesive inflammation. In the mouth only a firm cicatrix is to be felt, no trace of the presence of a fluid collection being any longer perceptible.—*Dr. Krabbel, Centralblatt für Chirurg.*

**RESORCIN.**—The increasing use of antiseptics in surgery within the last few years has brought to the notice of physicians many compounds, new and old, possessing the property of destroying the different plants concerned in putrefactive changes, and consequently stopping or preventing those processes; and as none of those in use are perfect and free from disadvantages, others will still be offered.

Carbolic acid, the oldest, of course stands first, and is in universal demand. Its disadvantages are its odor, which is offensive to many, its occasionally irritating character, and its serious poisonous effects when absorbed.

Thymol is occasionally used and is very good. Menthol and many others are equally reliable, but no better than thymol.

Dr. Justus Andeer, of Wurtzburg, has just written a pamphlet upon resorcin, as applied to medicinal uses, and recent numbers of *New Remedies* contain a long abstract of it.

Resorcin is a colorless crystalline substance, of a sweetish and



harsh taste, soluble in something more than its own weight of water, also soluble in ether and alcohol. It was first obtained in 1864, by fusing galbanum resin with potash, the result being about six per cent. It has since been made from other resins and in other ways.

Dr. Andeer found that a one per cent. solution prevented the decomposition of urine for months, and also destroyed the organic causes of putrefaction; it preserved pancreas and blood perfectly, retaining even their natural odors. Wounds treated by it healed by first intention, and those poisoned by septic material yielded to it as completely as to carbolic acid. Applied dry to the skin it is not absorbed, and is not irritating; hypodermically a two per cent. solution may produce painful cramps and twitchings, but never abscess. On the moist lips it will raise a white blister. Used with the atomizer it is entirely unirritating to either eyes or lungs, and nearly free from odor. Applied to granulations the crystals are a painless and mild caustic. Dr. Andeer also recommends its internal use in diphtheria and other diseases, and as injections in leucorrhœa, etc. The dose is one gram to two in water, syrups, glycerin, etc.—*Boston Medical and Surgical Journal*.

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## HINTS AND QUERIES.

"He that questioneth much shall learn much."—BACON.

CORRESPONDENTS desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

IF C. M. will try the modelling composition sold at the depots of S. S. White, he will get an impression that will astonish him, and do the work also.—G. V. N.

REPLY TO J. B. McB. (Hints and Queries, May DENTAL COSMOS).—I have a patient who had a similar experience from a red rubber plate with lower back teeth. After wearing it a short time it made the mouth and throat sore. After several ineffectual attempts to wear it she was obliged to abandon it altogether. A black rubber plate produced the same result, though more slowly. As a last resort I made her a gold plate, which she has been wearing some six months without any trouble. I believe that a metallic plate is the only remedy for such a difficulty.—M. E. SNIDER.

DENTISTS throughout the country have recently been in the receipt of a circular from a "Buchanan" Dental College, in Wisconsin, offering the degree of D.D.S. for \$12, the diploma to be sent by express, C. O. D., or on receipt of the money. Of course, such a piece of paper is not only worthless, but it is a standing disgrace to any one accepting it, and the time will come when its possessors will be as glad to be delivered from the odium, as graduates of the bogus Philadelphia medical schools would now be to obtain deliverance from theirs. But the present question is, shall the profession rest under the opprobrium until private enterprise, like that of the *Philadelphia Record*, drags the miscreant to light, or will all dentists rise as one man and unite to blot out the foul disgrace? The profession of Wisconsin and Illinois should take the initiative in this necessary work, and the eyes of all respectable dentists are turned upon them in expectancy. What say you, gentlemen? Have you any local or professional pride?—EASTERN DENTIST.

THE  
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ORIGINAL COMMUNICATIONS.

MAXILLARY ABSCESS WITH COMPLICATIONS.

BY D. H. GOODWILLIE, M.D., D.D.S., NEW YORK CITY.

(Read before the New York Odontological Society, April 17, 1881.)

WHEN the dental pulp becomes devitalized and is left in the pulp-chamber, the products of decomposition often find exit into the mouth through the external alveolar process, forming what is commonly called *alveolar abscess*.

Occasionally, however, the pyogenic membrane formed at the apex of the root becomes *enlarged*; the alveolar structure of surrounding bone gives way; and the pressure of the abscess will often force out the external wall of the alveolus. After great distention the abscess becomes ruptured, and the pus escapes in various directions, setting up trouble in adjacent parts. As this condition involves more hard and soft tissues, and as the pathological conditions are of a more serious nature, both locally and constitutionally, than in alveolar abscess, I have called it *maxillary abscess*.

The following cases will serve to illustrate maxillary abscess with many complications:

CASE I.—*Abscess of the inter-maxillary bone with discharge into the nostril*.—I. R. W., a banker (sent to me by Dr. F. H. Hamilton), has enjoyed good health until about five years ago, when he began to suffer from facial neuralgia and general debility. Traveled abroad for some time without any benefit. Had an attack of acute pleurisy soon after his arrival home. When I first saw him in 1871, he was much troubled with infra-orbital neuralgia, with naso-pharyngeal catarrh. Inferior meatus of the left nostril nearly closed, and a muco-purulent discharge passing post-nasally, and this gave him some throat trouble. Had pleuritic adhesions in the infra-scapular region of both lungs. On examination of the mouth, the left superior central and lateral incisors were found to be not firmly

supported in the bone. His attention was only called to these teeth from the fact of their looseness. One of them had a very small gold filling in it, put in many years ago. Some years before he was thrown from his carriage and sustained some local injuries, and it is supposed the pulps of these teeth were ruptured, suppuration followed, and they discharged into the nostril.

Treatment consisted in removing these teeth, when pus followed, and a probe passed into the tooth-sockets entered the left nostril. Some carious bone was removed by the revolving-knives. The nasal douche was used, and the nostril was thoroughly cleansed. Then the entire internal surface was coated by blowing in the iodoform camphor compound powder. By good general and local treatment, he entirely recovered, after rather more than a year's treatment.

I exhibit here the two incisors, and it will be seen that the root of the central incisor is about one-half absorbed, and the lateral incisor about one-quarter.

There was very little deformity left after the operation, which was readily made right by the artificial denture.

CASE II.—*Abscess of the inter-maxillary bone involving the palate.*—H. H. W. (recommended to me by Dr. Wm. Carr) came, suffering from a swelling just below the left nostril, and also one in the palate. The pulp of the left-central incisor was quite devitalized. The pulp-chamber had been drilled into from the palatal surface, but this gave no permanent relief from the discharge, for the reason that there was not sufficient opening made for the pus to pass readily out, and it therefore made its way through the hard palate and formed an abscess under the periosteum. Considerable redness and swelling existed in the inferior meatus of the left nostril, but it was not apparent that any pus had escaped into the nostril.

The abscess was trephined just below the left ala and at the apex of the incisor, and also at the swelling in the palate. By this operation free vent was given to the pus in two directions, and it could now be properly cleansed by syringing with thymolized water, and a drainage-vent put in to keep it patulous. The pulp-chamber was thoroughly cleansed and permanently filled.

The dressing was made twice daily, by forcing a pint of thymolized water through from the upper opening to the one in the palate. After the first three weeks, the dressing was made once a day until the passage filled up with new tissue. The wound in the soft tissue was not allowed to heal until granulations appeared in the passage through the bone.

It is now several years since this operation was performed, and the patient reports that he has been well ever since, and feels gratified at not having lost any teeth.



CASE III.—*Abscess of inferior maxillary opening externally and involving the sub-maxillary gland.*—Stanley T., aged 14 years (sent me by the late Dr. E. R. Peaslee), who had a large swelling on the left side of the lower jaw, including the sub-maxillary gland, which was very red and painful. There was a granular, fistulous opening characteristic of necrosis. A probe passed into the passage came down on dead bone. The first molar tooth on that side had a large amalgam filling in it. The patient was etherized and the molar removed, and necrosis of the lingual side of the jaw was found to exist. An incision was made into the external swelling three-fourths of an inch long. This was sufficient to let the revolving-knives pass the soft tissue to the diseased bone and to remove it. There being a good deal of thickness in the soft tissue from granulation, it was removed by the cautery, and the edges brought together by straps. By frequent and careful removal of the granulations, and strapping, the patient was soon discharged with scarcely any scar to be seen.

CASE IV.—*Chronic abscess of the inferior maxillary and the cheek.*—Mary A. had some inferior molars filled on the right side; soon after she suffered from neuralgia of the head, neck, and arm. Her family physician put her under treatment for malaria. Some months after, a slow, painless swelling made its appearance on the lower third of the masseter muscle. When she applied to me, the swelling was about the size of an English walnut, without pain or any redness, and very little motion in the jaw. Believing this to be a chronic abscess caused by the molars, an anesthetic was given, the mouth forced open, and the inferior molars of the right side extracted, when the whole cause of the neuralgia became known. Sticking through the apex of the root of the second molar was a steel nerve-broach about one-half of an inch long. This had been forced down the pulp-canal in the mouth, out through the foramen at the apex, into the tissues below, causing the neuralgia and the chronic abscess in the cheek. The abscess in the cheek was opened inter-orally. After a short treatment, she was entirely cured of neuralgia, chronic abscess, and ankylosis.

CASE V.—*Facial neuralgia and tonsillitis from maxillary abscess.*—A. M. P., born in New York, fifty-six years old, and up to the time of his present trouble of a very robust constitution. Some year and a half before he came under my care (in December, 1869), he began to suffer from neuralgia of the left side of the head, neck, and arm.

His teeth were examined and nothing abnormal found. His case was not relieved by any medication. His sufferings compelled him to give up his business, and he went abroad to try what a change would do to relieve him of his suffering; but he returned no better.

He had an attack of acute suppurative tonsillitis on the left side. After the discharge he got some temporary relief, but the old symptoms soon returned. At this time I first saw him, and on examination, found the left tonsil very much swollen, red, and very sensitive, evidently in the suppurative stage.

From the history of the case, I was led to consider it more than a simple case of tonsillitis; and to look carefully for the cause of this neuralgia that he suffered from for months before the first attack of tonsillitis. The nasal and aural cavities appeared in normal condition, with the exception that hearing was not so acute in the left as in the right ear.

He had all his permanent teeth without a single decay; indeed, he had never had occasion to have them examined until this trouble began, and then he was told it could not come from his teeth. There was no decay or fillings of any kind, and the gums were healthy. The enamel on some of the molars was somewhat worn by mastication. Under a very strong light I detected a change in color from the normal of the third left inferior molar, and on applying the electric current it aroused a suspicion, and in order to settle the matter, I drilled into the pulp-chamber through the dentine on the crown; there was no pain, and on withdrawing the instrument, pus came out of the opening, confirming the suspicion that this tooth was the cause of all the trouble.

The tooth was removed, and on its root was a pus-sac larger than the whole tooth. (Tooth exhibited with the sac.)

The pathological story is this: attrition removed the enamel, then followed chronic pulpitis, death, and decomposition of the dental pulp setting up suppuration, and the pus found its way to the tonsil, producing suppurative inflammation.

It need only be said in conclusion, that after a short treatment, he returned to his former good health and to his business.

CASE VI.—*Abscess of inferior maxilla with neurasthenia and partial paralysis.*—In July, 1877, I was requested by Drs. Otis and Bangs to see Mrs. B., who was suffering from great nervous prostration, with partial loss of motion of the left arm and of the neck; complained of no special pain; nose in normal condition; vocal cords thickened; voice husky; tongue very much coated; inferior left lower molars filled with amalgams; gum around them very spongy; teeth loosened; slight pericementitis of first bicuspid. Advised the removal of all the molars and the bicuspid of that side, which was done with the assistance of Dr. Bangs under an anesthetic. This revealed an abscess in the jaw under all these teeth, with necrosis of the cellular structure of the bone, which was also removed. On her recovery from the anesthetic, the power of motion had partially returned, and soon was

as good as on the other side. The opinion concurred in was that the trouble in the jaw was at least an exciting cause, if not the primary cause of the nervous exhaustion. Neurasthenia, the result of septic poison, many times occurs from just such causes as this.

CASE VII.—*Neurasthenia the result of septicemia from maxillary abscess.*—Dr. E. C. Seguin referred to me the Rev. J. W. P., suffering from nervous exhaustion. Some time since had a swelling of the front part of the lower jaw, and had a tooth extracted, with only temporary relief. On examination, found all the front teeth loose. Removed them with some necrosed bone. The apices of the roots of the teeth were eroded. Under proper treatment, he fully recovered his former good health.

CASE VIII.—*Aphonia from maxillary abscess.*—Rev. Dr. J. D. W. had considerable trouble with his throat for some time, and at length became aphonic. On examination, found left vocal cord congested, with non-approximation with its fellow; both arytenoids thickened; subacute pharyngitis; palato-pharyngeal muscle red, swollen, and sensitive. Rhinoscopic examination showed thickening of soft palate on left side; nares appeared healthy; complained of pain in the fauces. The unilateral inflammation suggested some special cause for this trouble.

On examination of the mouth nothing was found, except that the upper wisdom-tooth of the left side was loose, and when this fact was mentioned to the doctor, he recollected having had a few twinges of pain in some back tooth on that side. It was thought best to extract it; and on the root of the tooth there was a pus-sac. The pus from this suppurating tooth had passed down the palato-pharyngeal muscle into the pharynx, setting up inflammation and causing loss of voice. The doctor, on seeing the tooth with the suppurating sac on the root, pertinently remarked that the *root* of the *matter* appeared to be reached.

After a few days' local treatment, by means of the spray, he recovered his voice.

I treated a somewhat similar case at the Metropolitan Throat Hospital, some years ago. The apnœa was quite alarming, as the epiglottis was quite edematous, and the soft palate much swollen. But prompt treatment vigorously applied soon brought relief.

CASE IX.—*Abscess of inferior maxilla involving also the sub-maxillary and parotid glands.*—Prof. W. H. Thomson, M.D., referred to me the following interesting case, a synopsis of which is here given from the transactions of the Medical Society of the State of New York.

John W. O., lawyer, aged 24 years, born in Auburn, N. Y. Had inferior right molar filled with amalgam; suffered for about a month with great pain and swelling extending up the cheek and under-



neath the jaw. Had tooth extracted, but pain and swelling continued. An abscess formed and opened on the neck, an inch below the angle of the jaw. Had exfoliation of a portion of alveolar process.

A short time after this, he came under my care, when he presented the following conditions: Great swelling over the region of the parotid and sub-maxillary glands; fistulous opening below the ramus communicating with the parotid and sub-maxillary glands; greatest amount of pus came from the parotid; partial ankylosis; jaw inside quite healed; no discharge now into the mouth by the duct of Steno. Treatment consisted in freely opening the sinus, as the pus had burrowed under the skin of the neck. Probe passed into the parotid gland up nearly to the zygoma. Ordered a poultice to be applied during the night. A truss was worn in the day-time, so that gentle pressure was brought upon the gland to cause the discharge of the inflammatory products, and to prevent temporarily the function of the gland. After a treatment of four months, he entirely recovered.

CASE X.—Prof. R. P. Howard, M. D., of Montreal, Canada, sent Frank McM. for treatment of some nasal trouble, and the patient gave an account of a severe inferior maxillary abscess, where the pus followed down the course of the sterno-cleido-mastoid muscle, and opened just above the sternum, producing a large cicatrix.

The following case that came under my care (wax models of which I exhibit to you) presents so many interesting points, that I take the liberty of presenting it in full.

CASE XI.—*Case of suppurative disease of the antrum of Highmore, with dislocation of cartilaginous septum, of twelve years standing.\** (Read before the Canada Medical Association, at Ottawa, September, 1880.)—"Dr. D. M., of Ontario, Canada, consulted me in November, 1879, and gave the following history: in 1865, had pain in his second left superior molar tooth, and an unsuccessful attempt was made to have it extracted. This probably resulted in rupturing the vessels of the dental pulp, as the doctor says the tooth was started from its socket and then pushed back again. Some time after, because of intense pain and swelling of the face, a second attempt was made to extract the tooth. This was not entirely successful, as a root was left in the jaw. From this time the discharge began, and continued until I saw him, more than twelve years after.

"He presented the following conditions: first and second molars gone from the left superior jaw. Above the alveolus, at the position of the second molar, was a fistulous opening, made by passing a

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\*"Canada Medical and Surgical Journal," Montreal, October, 1880.

trephine some years ago into the antrum; in this opening he wore a hard-rubber drainage-tube, but as it was small in calibre, and too high up to drain the discharge from the antrum, it was of very little use. It also excited granulations in the cavity. A gelatinous polypus was found in the left nostril, growing from the middle turbinated bone. This hung by a pedicle over an opening made by necrosis of the inferior turbinated bone and the nasal wall of the antrum. From the blowing of the left nostril by closing the right with the thumb, to free it from the constant discharge, the lower end of the cartilaginous septum was dislocated and turned into the left nostril, preventing respiration except when forced. In the pharynx, a muco-purulent track was to be seen on the left of the vertebral ridge, caused by the discharge passing down from the posterior nares. This caused a good deal of expectoration. This trouble, continuing for so long a time, had somewhat affected his general health.

"On the doctor's first visit in November, 1879, I only removed the polypus, as it was necessary for him to return immediately home to meet some professional engagement.

"In April, 1880, he returned, and under an anesthetic, I made first an operation on the dislocated nasal septum. An incision being made through the soft parts down to the end of the cartilage, I denuded and pushed back the soft parts, then amputated the protruding cartilage of the septum. The soft parts being brought together and held by silk sutures, this healed by first intention, and in a week's time it was difficult to tell where the incision had been made. The next part of the operation was trephining through the alveolar process at the position of the first molar, directly into the bottom of the antrum, by means of a large bone-cutting drill driven by the surgical engine. This opening gave exit to the pus pent up in the cavity of the antrum. The last part of the operation was the removal, by means of the revolving bone-cutters, of the necrosed turbinated bone and the naso-antral wall, through the anterior nares. This made an opening from the nose into the antrum, extending from the floor of the inferior meatus to the middle turbinated bone, and antero-posteriorly about an inch. Through these openings the antrum was freely washed out with thymolized water, and medication applied, which consisted in blowing into the antrum the iodoform camphor compound powder by means of the insufflator. There were present at this operation Drs. Farnham, Carry, Warden, and Bucklin of New York, Marvin of Brooklyn, and Braden of Michigan.

"I pass round wax models showing the case before and after the operation. The doctor also kindly presents himself for your examination. You will see that the respiration through the occluded

nostril is quite free. The opening from the mouth into the antrum is now closing up. A permanent opening will remain in the naso-antral wall, where the necrosis was removed. The purulent discharge has ceased, and he is in robust health."

In a number of cases the pus-cysts attain a certain size by the absorption of the cellular tissue, and the forcing out of the external plate of the bone. There appears to be a sufficient amount of absorption of the pus to prevent its invasion of neighboring parts. Some local uneasiness may be felt, but more often facial neuralgia with fixed or shifting foci. These cysts cannot be satisfactorily treated through the pulp-canal, as no treatment short of destroying the sac will be successful.

Two methods are employed, viz.: To extract the tooth, or to save the tooth and trephine through the bone into the cyst. In the first case, extracting the tooth will usually be sufficient. But cases occur where the trouble continues,—as when the sac remains after the tooth is taken out,—the socket fills with granulations, or a small fistula may remain.

It is well always after such teeth are removed, to pass an instrument up the tooth-socket into the cyst and break it up and then apply caustic.

When it is desired to save the tooth, then trephine through the bulged portion of bone at the apex, and partially covered by the muscles of the lip, into the cyst. Use either a tapering three-edged instrument set at an acute angle, and having a good large handle, or by means of the engine a flat two-edged, or a spiral trephine. Put the muscles of the lip on a stretch, so that the outline of the enlargement may be seen, then thrust through the bone into the cyst, and at the same time enlarge the opening and effectually break up the cyst; then apply some caustic upon the cyst surface (chloride of zinc or saturated solution of iodine). I use with a great deal of satisfaction the galvano-cautery, applied with a proper electrode. It is a very prompt and effectual treatment.

Keep the soft parts patulous by means of antiseptic oakum lint. Dress often by syringing well with water, then place in the bottom of the wound a small piece of iodoform lint, that is soluble at the heat of the body. (I formerly used to blow the powder in.) Apply a cold-water compress over the cheek to prevent swelling. Have very great respect for the granulations that ought to fill the cavity from the bottom, and do not let the soft parts close until you know the bone-cavity is filled.

Fill pulp-cavities and cavities of decay when you first begin treatment. When performing the operation, I usually give an anesthetic (NO), and strap down the head the same as in operation in the nose.



Many of these cases of great suffering came through wretchedly filled teeth. Need I add the moral?

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### OPERATIVE DENTAL SURGERY.

BY W. FINLEY THOMPSON, M.D., D.D.S.

(Delivered at the National Dental College, London.)

CONSIDERING the effects consequent upon the retention of any portion of a devitalized pulp in its chamber,—as irritation of the periodontal membrane,—caused by the results of decomposition, gaseous or fluid, it may be readily inferred that such a contingency is necessarily followed by a train of complications not always easily controlled. The obvious indication is to remove every incentive to hyperemia, preventing, if possible, lesions which might otherwise seriously involve the surrounding tissues. In this, much will depend upon the skill and judgment brought to bear in the preparation of the minute and tortuous passages, which naturally follow any distorted configuration of the roots. The injurious influences of structural change are apt to be underestimated; and, for this reason, I direct attention to the importance of adopting the most effective measures.

In removing the pulp, do not allow the instrument to pass beyond the foramen at the apex of the root, as the remaining trunk of the nerve may retain its excitability in the immediate vicinity of this point. The instruments used should be pliant, that they may be easily bent in any direction to prevent accident; for it is always awkward when a broach becomes broken in these, not infrequently, almost inaccessible localities. Pluggers of exceedingly delicate shape are now required; these should be well tempered, and, for some distance from the points, flexible, that they may readily adapt themselves to the varying curvature of the canals. Every precautionary measure must be taken to insure perfect impaction of the gold in the interstices between the apical foramen and the pulp-chamber; for, should any space be left near the apex, exudations will percolate through the foramen, which may, by the generation of gases, induce a pathological condition difficult to control.

Perhaps a more effective way to prevent abnormal excitation would be the use of wire made of pure gold, which, being soft and pliant, readily adapts itself to the shape of the root. The wire must be shaped so nearly the size required, that, with finely-pointed pluggers, it can be driven to its position, as illustrated in Fig. 3.

In cases where susceptibility to thermal change exists, with a predisposing inflammatory condition of the periodontal membrane,

a substratum of some non-conducting substance may be introduced. Against such cause of possible future derangement, you will be guided as to the necessity of prophylactic measures by a knowledge of the diathesis of the case.

Another method of filling the roots is with oxychloride of zinc, which may be done by using fibers of silk, saturated with a thin solution of this preparation, and carried along the pulp-canal by the use of broaches, packing rapidly, that the material may not set before the cavity is filled. Where restorations are made with gold, no portion of any other material used for filling the roots or protecting a sensitive pulp should be exposed to the secretions of the mouth, or the work will be undermined by their action.

If a temporary filling is made, gutta-percha or Hill's stopping will answer the purpose very well. This is especially adapted for what is called a "test filling," after the treatment of teeth, for the reason that it can be readily applied, and removed when occasion no longer demands its use.

Another case, illustrative of the fourth stage, is shown in the prepared cavity, Fig. 1, which corresponds to No. 3, Fig. 1, previous lecture. *a, a, a*, anchorages in or near buccal, ante-lingual-medial, and post-lingual-medial regions; *b, b*, the reduced wall and beveled edge.

Here the buccal wall may be depended upon for its complement of the total resistance to the pressure which necessarily results from the opposing teeth coming in contact with the surface of the filling. But, in order to preserve the lingual wall, the basal, as well as intermediate portion, must be protected by sacrificing the frail line of enamel to which the wall has been reduced at the crown-surface. This, being diminished in thickness as it rises from the floor of the cavity, presents a knife-like edge, quite incapable of offering resistance to lateral pressure. Notwithstanding its lack of thickness, the enamel may be good, and capable of much service, if protected from the leverage to which its exposed position subjects it; but, in order to prevent fracture at the top or base, it must be framed in, so as to be exempt from shock or lateral disturbance. To accomplish this, the wall must be cut down from the edge until an appreciable thickness is attained, and then, with evenly-mounted disks, be beveled at an angle of about 30°. The gold being carried over this beveled edge, the effect of any pressure is to clamp the frail portion, thus shielding it from antagonistic force. The diagram, Fig. 1, better illustrates the walls, angle, and contour of the prepared cavity.

In molar teeth, decay is sometimes found extending antero-posteriorly completely through the tooth, approaching from opposite directions, until the central portion is destroyed, leaving the outer and inner walls of the tooth standing.

This is exhibited in Fig. 2, antero-posterior view of a lower molar, with cavity prepared for filling; being split between the roots, the section shows the profile of the walls, the situation of the screws, and two of the anchorages preparatory to filling. *a*, beveled edge of lingual wall; *b, b*, anchorages in line of section; *c, c*, headed screws sunk in floor of cavity (omitted in Fig. 3). This figure must be considered simultaneously with its companion diagram (Fig. 3), which is an antero-posterior vertical section from the ante- to the post-approximal surface, showing the interior of the buccal wall. *a, a*, grooves; *b, b*, anchorages; *c*, pulp-canal filled with gold; *d*, pulp-canal prepared.

When the roots are filled, the preparation of the cavity in the body of the tooth may be continued, as represented in Figs. 2 and 3. After the walls have been carefully dressed, and the outer surfaces finished, a fine bur should be passed along the inner portion, making four vertical grooves in the walls of the cavity. At the bottom of each groove an anchorage or retaining-point is required; these grooves—two on either wall—are situated near the four angles, rather less than a line from the outer edge of the cavity, and extend from the floor to a line separating the dentine from the enamel. Especially do I lay stress on the expediency of having anchorage at the termination of interstitial cavities when situated upon the occluding surfaces of molar teeth.

In Fig. 2 are attachments for the gold, besides those already mentioned; two additional anchorages being formed at the foot of the walls, and midway between the four angles at the approximal edges of the cavity, while at equal distances between these walls, are inserted two gold screws. The heads of these screws are so far conical that, when built in their appropriate places, all tendency to unsteadiness is removed.

The grooves and anchorages having been formed, with the screws in position, the filling should be commenced in one of the retaining-points, the gold being conducted diagonally, intermediate between the walls; then, building from the opposite end of the diagonal, it may be worked towards the common center, between the two screws.

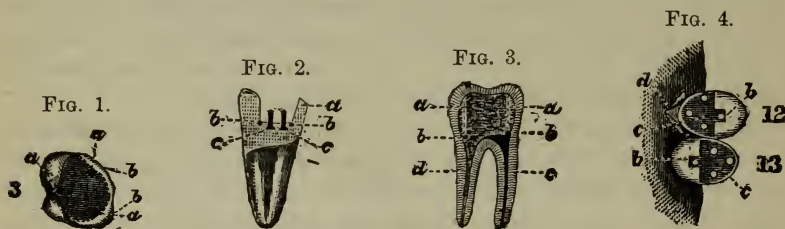
This process is repeated at the ends of the other diagonal, always approaching the center, in which, eventually, the walls of both diagonals meet, thereafter connecting them with walls stretching from side to side of the cavity, and along the base. Four triangular cells will thus be formed, out of the floor of which the threaded portion of the screws will project.

By this methodical procedure, a network of gold is secured, which, from its position, anchorages, grooves, and screws, offers resistance to any change of form, being welded into a solid mass in which the walls and cells intervening are blended and lost.



In building, do not forget to devote proper attention to packing along the vertical grooves, as they steady the filling while being built up further from the floor of the cavity. If the gold be used in small pieces, torn from the leaf, introduced into the vertical line, and tapped gently, there is no probability of the filling becoming detached, unless, as sometimes does occur, the outer or inner wall gives way. This can be prevented by dressing down the occluding surfaces, so that the gold may be carried over the edges (see *a*, Fig. 2) on the principle before explained. The outer portion, being lower than the inner, draws the standing wall of the tooth towards the filling, thereby keeping it in place; being built above with gold, no force can come in direct contact with the tooth.

In Fig. 4 (corresponding to Nos. 12 and 13, Fig. 1, previous lecture) are two bicusps prepared for filling, in which one cusp only is left to each tooth. To supply the deficiency here manifested will require not only time, but considerable skill, for the means of attachment are not of a promising nature. These cavities are prepared by cutting perpendicularly and transversely, with a view of



preserving as much of the tooth as possible, and by forming the floor in such a manner that its interior surface shall be slightly beneath the level of the approximal and buccal, or approximal and lingual surfaces, so as to leave a slight elevation of tooth-substance as a rim extending from the wall of the cusp entirely round the floor of the cavity. This rim acts as a support to prevent lateral displacement of the gold, the floor of the cavity having a flat, horizontal surface, on which the filling is built. As in the previous cases, it is beveled, and the gold worked over and upon the edges of the enamel. A square groove should now be cut vertically in the standing cusp, of perhaps one-eighth of an inch in depth. In the step thus formed, a short screw is inserted (see *b*, *b*). On the floor (*c*) of the cavity are three longer screws in position, as shown by the white dots in Nos. 12 and 13. The anchorage, or starting-point, is situated in the middle of the floor (*c*, *c*). The filling has now a wall on one side, and a rim on the other; and, as the gold is built round the screws, it becomes firmly fixed to the floor, while the groove and the anchorage provided in it retain the gold in position,

thus preventing any movement in the direction of the approximal surfaces.

The restoration should be fully contoured and flush with the remaining cusp, to protect it against accident; for, upon its preservation, depends the permanency of the filling.

In the extreme cases now cited, it will often be found necessary to cut the gum and lay it well back. This has been fully and extensively dwelt upon in former lectures, in connection with the use of clamps,—the manner of treating the gum when impinging upon portions of the tooth to be operated upon having been illustrated in several figures.

I shall now refer you to the right lateral incisor in Fig. 3, preceding lecture. Here the area and depth of the caries are so great that, when the diseased portion is removed, there is apparently but little to which the filling can be securely attached; yet it is desirable to avoid exposure of gold upon the labial portion of the tooth.

In Fig. 5 the pulp-canal is laid open, showing a hollow, split cylinder of gold, inserted in the root previous to filling the tooth.

FIG. 5.



FIG. 6.



FIG. 7.



FIG. 8.



This cylinder is represented in Fig. 6, and the cavity is prepared with a view to the insertion of this tube, the longitudinal division being made on one side, and extending its full length to permit enlargement of the tube at a later period of the operation. The tube is inserted in a socket formed by enlarging the pulp-canal to about the depth represented by the black marking in Fig. 5; the upper portion of which is removed obliquely on one side to about half its diameter, and about one-tenth of the total length. The edges, being parallel to the sides of the cylinder, are left similar in shape to the formation of a pen, on the projection of which three gold filaments or branches are soldered. When the cylinder is *in situ*, the "scoop" and filaments stand approximating the inner portion of the labial wall. The permanent retention of the tube is now secured by building within it, the pressure causing it to accurately fit the socket.

Restoration is made along the mesial and distal walls of the cavity, in advance of the filling in the central portion of the tooth, until it reaches a line parallel with the junction of the first extension of the tube. Should the arms be an impediment to the build-

ing process, being flexible, they are pushed aside, until the gold is carried to the points of their juncture, after which the arm first approached is forced down upon the floor of the filling, the work being again resumed until the junction of the arm on the opposite side is reached; and, that its point may not extend beyond the filling when finished, this also is forced on the floor, as in the case of the first. The third extension is permitted to remain in an oblique position, but so directed that its point falls inside the line of the surface of the filling, as it assumes a narrow or wedge-like shape on approaching the cutting edge of the tooth. When restoring along the mesial and distal lineal border of the cavity, care should be observed to prevent horizontal fracture in the central portion of the tooth. The strain becoming obviously increased by the repeated blows of the mallet, as the filling approaches the cutting edge of the tooth, precautionary measures should be adopted to support the enamel by the application of steady force upon the labio-cervical two-thirds. This may be accomplished by the adjustment of a splint made for the purpose, so that the oblique line, or wall of decay, will permit the gold to be substantially packed along its facing surfaces.

In the same mouth (see Fig. 3, preceding lecture), the central incisor and the canine are similarly affected, with this exception, that the caries in these teeth advances from the mesial and distal surfaces towards the central portion of the tooth, ending in a junction of the decay. The disease has penetrated the pulp-chamber in both instances. The sound portion of the tooth on the lingual surface, when dressed, conveys the impression of a septum between the cavities; but the removal of the devitalized pulp forms an interior connection, leaving the septum rather as a support than a division. The extensive undermining of the linguo-cervical portion of the tooth, involving the mesio-lingual and disto-lingual points, indicates the propriety of still further using the septum for the protection of the labial surface. This is effected by carrying the gold over it, and completely framing it in. To prevent any projection beyond the original lingual contour, the tooth-substance is removed to a depth of about the third of a line, extending to distances marked in Figs. 7 and 8, and tapering so as to connect the cavities without angularity.

The commencement of the filling is in the anchorage points *a, a*, and is continued by building along the inner plate of the labial wall, *c, c*, until the gold has been carried to a level with the septum *b* as prepared; it is then worked over this to preserve the contour of the tooth.

In the left lateral (Fig. 9), decay had so destroyed the substance



of the tooth that the enamel of the labial surface was literally all that remained above the gum. This was frail and brittle, appeared semi-transparent (*a, a*), and presented ragged and uneven edges.

The pulp-canal being prepared and filled, on the floor (*b*) two rectangular excavations were formed, and in each of these an anchorage was made, which, with the filling in the pulp-canal, gave a very strong attachment vertically. To prevent lateral displacement, the feathery edges of the remaining enamel were carefully dressed, reduced slightly in height and width, and then beveled from the labial to the lingual aspects. The gold, as it rose from the base of the filling, was returned upon the bevel; and, when the operation was completed, and the restoration of the contour of the tooth effected, the wall of enamel appeared framed with gold on three of its boundaries, as represented in Fig. 10, *c, c, c*.

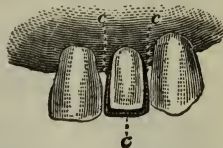
FIG. 9.



The next case presented for your consideration is one of unusual interest; and, should the method I propose to demonstrate be adopted by the profession, the arch may be in some cases, where only one or two teeth are missing, restored to its full power by the replacement, without plates, of the lost organs.

I formerly regarded with prejudice, and participated in the general impression as to the futility of, the means employed in cases of this kind; but I have seen results which prove that, under favorable conditions, a lasting success may follow such treatment. The adoption of this species of practice must be entered on cautiously; for, unless the neighboring teeth are of solid structure, in healthy relationship with the surrounding tissues, and have living pulps, failure, threatening the expulsion of the natural organs, may be predicted. The tendency of modern dental science has been to render interposed teeth as independent as possible of support from adjacent living teeth. . . .

FIG. 10.



It is not the exception, but the rule, to find the arch broken in mouths presented for professional advice, the tooth lost almost invariably being the first molar. . . .

Unquestionably, the first molars are more susceptible to the influences of disease than any other members of the permanent dentition, except the wisdom teeth. The removal of the first molar produces a break in the continuity of the arch, often entailing upon the victim a series of evils quite overlooked, because not traced to the insufficiency of the remaining triturating organs. An intervening space, when existing at any intermediate point along the buccal line,

more seriously interferes with mastication than if the loss were directly in the center of the arch, or at its terminal points. . . .

The first molar, at its eruption, is very frequently mistaken by parents for a temporary tooth. Unrecognized, it assumes its position behind the deciduous teeth; and a lack of knowledge leads to neglect, under the idea that care is unnecessary; so that the tooth, which is for a long time in a comparatively feeble condition, is often irretrievably injured before aid is sought. It is also subject to contingencies connected with the shedding of the temporary teeth, owing to loss of its support and the force of the muscles not being distributed equally over the other molars and bicuspid, for some years subsequently.

The recorded results verify the prognosis we are endeavoring to establish; the first molar being more frequently than any of its fellows attacked by disease. From the tables of Magitot, it will be seen that about thirty-three and five-tenths per cent. of the total number of cases of caries are attributable to this tooth.

So great is the antipathy to any mechanical appliance in the mouth, that, when a few teeth only are missing, protests are frequently made against the ordinary artificial auxiliaries; provision should therefore be made to restore missing teeth with the least possible discomfort to those who have been so unfortunate as to lose them.

By reference to the diagrams illustrative of the method now to be considered, will be seen the several stages as indicated; but a more comprehensive idea may perhaps be obtained from the model which

FIG. 11.

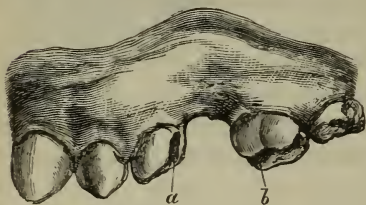


FIG. 12.



I now pass for your inspection, the buccal view of which is shown in Fig. 11, in which *a, b* represent cavities prepared in the molar and bicuspid teeth. Fig. 12 is the lingual view, and Fig. 13 shows the floors of the cavities prepared for the adjustment of the tooth.

Here it will be noticed that the arch is complete, with the exception of the first superior left molar; and, as generally occurs, unless the teeth are extracted at a very early age, or before the eruption of the *dentes sapientiae*, partial closure only of the interspace is the result.

In this case, it will be seen that the two bicuspsids have fallen back to anticipate the advance of the molars, the second bicuspid having receded until it is independent, and quite free from any impingement upon the adjacent tooth. The first bicuspid, however, has followed until the space between it and the canine is of much greater extension, showing that the canine has not moved sufficiently to effect a closure equal to that existing between the two bicuspsids.

Again viewing the space formerly occupied by the missing tooth, you will observe, by the partial closure, that a bicuspid only can be used. This I have had adjusted to the model that you may be able to see its relative bearings, not only upon the gum, lingual and buccal, but the manner of its attachment to the adjacent teeth.

The porcelain face being adapted to the buccal aspect of the gum, the deficiency upon the lingual side is, you will observe, fully restored with gold, and contoured in conformity with the adjacent teeth (*d*), due observance being paid to its dimensions extending in a linguo-buccal direction. On the sides of the tooth are bars of

FIG. 13.

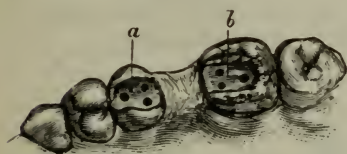
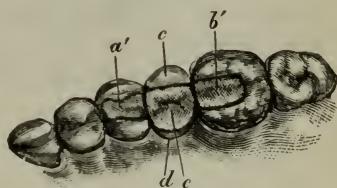


FIG. 14.



pure gold, which extend into the adjacent teeth, over the floor of the cavities to their medial points; and beyond this is located an anchorage in which to start the fillings that are to close in and securely fasten these projecting arms in place. *a'*, *b'*, cavities filled, indicating points showing termination of cross-bars in teeth; *c*, porcelain face; *d*, point of juncture of gum with linguo-cervical portion of interposed tooth; *e*, gold cusp, made in conformity to adjacent teeth, and to articulate with those opposing.

While in practice you are expected to follow the guidance of fixed principles, the mind should be free to accept any measures found more applicable than traditional methods. I have said that "unless the neighboring teeth are of solid structure, in healthy relationship with the surrounding tissues, and have living pulps, failure may be predicted." I shall now qualify that remark by saying that, although pulpless teeth are objects of suspicion, there are circumstances under which the risk of attaching a crown to them, as just described, may be taken with little or no prospect of bad results. Immobility, evidencing the integrity of the periosteal



circulation and the general tone of the wearer, should indicate when a devitalized tooth may be used for this purpose. I question, however, under the most favorable conditions, the advisability of actually fixing, in the manner already described, an artificial crown to a pulpless tooth. In view of its lack of vitality, it would be better, if possible, to avoid any tension further than vertical pressure.

In the case I am about to describe, the original space of the missing bicuspid was but little diminished, so that the substitute was modeled in nearly the form of the original tooth. Its cervical boundary was made to accurately fit the surface of the gum, while cusps and concavities were established on the crown, in perfect conformity with the indentations and cusps of the antagonizing teeth. The arrangement for its retention was somewhat different from that in the case just illustrated.

The first bicuspid—devitalized—permitted the connecting-bar on the ante-approximal surface of the substitute to be formed so that it fitted into a prepared socket. But in the molar—a living tooth—the filling was much more circumscribed; no vertical turn could be given to the attachment which it was proposed should pass from the substitute into the filling. One end of the bar was placed in a nearly horizontal position, and projected at slightly less than a right angle to the post-approximal surface of the substitute.

FIG. 15.

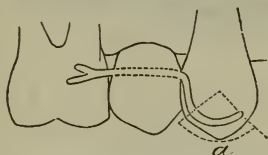


FIG. 16.



After the preparatory cavities in the teeth were filled, a secondary cavity in the gold was formed, and the interposed tooth adjusted to the gum, and articulated with the occluding teeth; the extension-bar (*b, c*, Fig. 16) was then secured by building it into the secondary cavity in the filling of the molar. The model which I submit for your inspection will perhaps better explain my meaning, which is still further illustrated by Figs. 15 and 16. The arm on the ante-approximal portion, being of greater length than that on the post-approximal, is bent into a curve which forms part of a circle having the groove in the filling, corresponding in curvature to the wire, for its circumference.

By this arrangement, the dead tooth is permitted to vibrate through a short arc (*a*, Fig. 15) without altering the nature of its attachment. The curved arm (*a*, Fig. 16) is adjusted to accurately fit the groove; pressing the tooth firmly, but not aggressively. The

grooved socket, extending over upon the occluding surface, is formed entirely in the gold filling, no fractured or decayed portion of the tooth at any point being exposed to the secretions of the mouth, while the extension-arm and socket are simply the action of gold upon gold.

In the case of two bicuspid, I had the missing teeth carved in block, so as to fit the model and articulating cast. A platinum bar, which extended through both teeth, was adjusted in the block similar to that represented in *b*, Fig. 16. In using mineral teeth, the chances of detecting them as artificial are much lessened, while the artistic appearance of the work is materially enhanced.

The buccal and lingual aspects of the substitute must be contoured so as to strictly conform with the natural curve of the arch, the object being to make this foreign body undistinguishable in form from a natural tooth, while its very existence should, during the ordinary avocations of life, be forgotten by the wearer.

Where the arms require to be made very delicately,—the shape or condition of the teeth not permitting extended excavation,—pure gold, with such small sectional dimensions, will not be sufficiently rigid. The bars are then to be made of platinum, this being a malleable and tenacious metal, which, once established in position, is apt to be retained.

Without being influenced by the prejudices of others, I have endeavored to enunciate a method which may, for a time, be skeptically received. The adverse criticisms by the profession heretofore, I believe to have been caused by ill-advised operations upon teeth having their investing membrane complicated by disease at a recent or remote period. Hence the necessity of ascertaining the pathological condition of the organs that will permit an operation of this nature.

## THE PLAIN RECORD OF THE "NEW DEPARTURE."

BY J. FOSTER FLAGG, D.D.S.,

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MEMBER OF CALIFORNIA STATE DENTAL ASSOCIATION.

(Read before the California State Dental Association, June 14, 1881.)

AFTER more than three years of determined effort at plain speaking and careful writing, there is still to be found an occasional individual who believes that the champions of the "New Departure" were unguarded enough to enunciate that "in proportion as teeth need *filling*, gold is the worst material to use." But it is happily now understood, by a large majority of the members of our profession, that such a statement never was made, and that every New Departurist would regard such as the farthest possible from truth.

It is also true that as yet an occasional sneer is heard in reference to the enunciation that "a filling may be the *best* known for the tooth and yet *leak badly*;" but it has been so repeatedly demonstrated, that gutta-percha makes at best a very leaky filling, and yet that in certain places in certain kinds of teeth it has proved itself to be the very *best* and most durable tooth-conserver which we possess, that even this sneer is now regarded by the majority as indicative of ignorance rather than erudition. Even with these marked modifications of opinions, it is, however, a far too prevalent idea, that the "New Departure" practice is either exclusively devoted to the use of the various plastic filling-materials, or, at best, that it assigns to gold a very low position, and regards it with feelings nearly allied to contempt.

So far from this being true, it is everywhere *plainly recorded* that it is the ABUSE of gold which is antagonized by the advocates of the "New Departure;" and equally *plainly recorded* that they recognize to the very fullest extent the admirable, the undeniable, the *incomparable* capabilities of this most excellent filling-material.

I have always taught that, "for *accessible* cavities in teeth *above medium* in structure, gold is the king of all filling-materials." This I have enunciated from the lecture-stand and acted upon in my clinics, year after year, for twenty years. And is it "reasonable," or would it be "consistent," that I should condemn *it*, or advocate *its abandonment*? I should say *not*!

Let us look at the *record*. It is by this that the future of dentistry will judge the workers of the "New Departure," and it is by this that it will also judge the doings of our adversaries. I shall show you, gentlemen, how sincerely, how truthfully, and with what care for the merits of gold, the work for the "New Departure," has been prosecuted, and you will then see how reckless have been the misconceptions and the broadly-spread misrepresentations of our antagonists.

It has been thought to weaken our attack by declaring the well-known fact that gold fillings will last *frequently* for twenty, or even thirty years.

What is the admission of the first enunciation of the "New Departure?" In the report of the speech which I had the honor of making, in behalf of my co-laborers, before the New York Odontological Society, November, 1877, it is written:

"I do not wish to say anything to you of the teeth which you are in the habit of filling successfully, and, as we express it, satisfactorily, with *gold*; teeth of dense structure, whose cavities have walls so strong that you can impact a filling *which lasts a lifetime*!" Is this denying capability to gold? Does this stop even at twenty or



thirty years? It says "*a lifetime*;" it means *forty, FIFTY, SIXTY* years, if you will; it means that the advocates of the "New Departure" knew full well the possibilities of the *proper use* of gold, and desired to give it its full meed of praise; it means that our work was too broad to permit of unjust detractions, and broad enough to admit of all just concessions. It was but a few months before the "opposition" reported me as having said, *on the above-mentioned occasion*, that "gold as a filling material for teeth was entirely discarded," following up this unwarrantable misrepresentation by the assertion that "this 'new departure' has advocates in various parts," and mentioning Dr. Palmer, of Syracuse, N. Y., as one.

Note Dr. Palmer's reply in the DENTAL COSMOS, August, 1878, page 427. "The reader can well imagine the wrong that would be done to the 'New Departure' and its advocates, were the statements believed that the use of gold is discarded or condemned where it can be successfully used."

"The principles advocated by the 'New Departure,' as I understand them, concede the use of gold as a filling material, wherever and whenever it can be used for the preservation of teeth as successfully as other materials."

"The 'New Departure' begins where gold leaves off."

In the DENTAL COSMOS for September, 1878, is a paper which I read before the American Dental Association at Niagara Falls, and which advocated the exclusive use of plastic filling-materials, in a practice which I explicitly stated was composed "*to the full*" of *very soft* teeth; you will find it again squarely stated to the assembled "representative men," as follows:

"But while I advocate thus strongly the use of *plastic filling-materials*, and while I state to you that *I* have completely abandoned gold, I wish you distinctly to understand that this practice is not now, *and never has been*, advocated by the 'New Departure.'

"In the presentation of our desires, *it was expressly stated just what kinds of teeth should be filled with gold, and just what kinds of teeth should be filled with plastics.*"

In the DENTAL COSMOS for March, 1879, page 132, Dr. Palmer, in writing on "The Science of Filling Teeth," says:

"Because of assertions that the doctrine advocated by me abrogates the use of gold, I will again repeat that this *never* was a 'New Departure' claim."

When the advocates of the "New Departure" concluded that they were prepared for the attack, and although it was at once defiantly announced that they "had not prepared for only a small struggle," but were ready for the fight; had "plenty of shot in the locker," and were about to open their batteries in earnest "against the accepted

dentistry of the day," it was nevertheless thought that the whole thing would soon be easily stifled, and that it would pass into dental history as a vagary alike whimsical and impotent.

These anticipations were, however, not realized; the schism grew apace; its adherents increased in number; many excellent men spoke openly in favor of its doctrines, and a vastly greater number leaned gracefully toward the practicality of its teachings.

At last, after nearly a year had elapsed, *one* systematic reply was made in the vain attempt to stay the tide.

In the "ninth" section of this series of arguments it was again asserted that "the *abandonment of gold* means the forsaking of the metal which has made the American dentist what he is."

Again, for the FIFTH time it was replied—DENTAL COSMOS, June, 1879, page 316:

"The 'New Departure' nowhere teaches the *abandonment of gold*; on the contrary, it knows just where gold can be satisfactorily used quite as well as does the essayist. Every one of its strongest advocates has had quite as extended opportunity for observation in this direction as the essayist has had.

"We think that we have each given much more sufficient evidence of our capability of judging of this matter than has the essayist of his capability of judging of the merits of the 'basal principles' of the 'New Departure'; but we would have *mind* as well as *metal* have something to do with the making of American dentists; that thus we may have gold *used* instead of *abused*; that we may have its power for usefulness defined; that we may see it exemplifying its utility *whenever we see it*, instead of so very, very frequently only exemplifying the wretched combination of 'defective manipulation' and 'incompatibility of material with tooth-bone.'"

Now, my fellow members, I ask you, Can anything be more definite or decisive than the stand which the "New Departure" has taken FROM THE FIRST and maintained to THE LAST, in regard not only to the *non-abandonment of gold*, but as to its high and proper appreciation of the eminently valuable characteristics which gold possesses as a filling-material? And again I ask you to reflect upon the question, How is it *possible* that it could have been otherwise? It was not the aim of the "New Departure" to decry a *metal*, but it was its object to antagonize its *idolatrous* worship, and to restrain its abuse. It was the aim of the leaders in this movement to so direct the observation of the thinking men of dentistry that they should see the folly of giving pre-eminence to any *one* material by ranking it invidiously as "*the best*." It was not intended that the crusade of the "New Departure" should have for its work the petty and ignoble task of *gold damnation*; but that it should sweep, as it has swept, rampant

with the power of its great and glorious mission—"tooth-salvation." This was its war-cry in its onslaught. It is by the fairness of its propositions and by the truths of its teachings that it has increased the number of its followers; its advocates are earnest and sincere; its arguments have not been met, much less refuted, by its opponents; the *results* which its methods prove to be *easily accomplished* are recognized by those who have examined them, as eminently "satisfactory."

The "New Departure" has worked for the *saving of teeth*; this is its *only* end and object. Under this banner it has thus far marched triumphantly, and under this banner *it means to conquer!*

### CAPILLARY ATTRACTION AND CONTOUR FILLING—THE OTHER SIDE.

BY THEODORE F. CHUPEIN, D.D.S., PHILADELPHIA, PA.

DR. SHOEMAKER contributed to the June (1881) number of the DENTAL COSMOS an article on "Capillary Attraction in its Relation to Contour Filling." This reply is not made in any spirit of controversy,—as the old ground was pretty well gone over between Dr. Webb and the writer,—but merely to state again "the other side," so as to keep the *principle* in view, and to exhibit the two modes in their proper light before the dental profession by the advocates of each.

If the diagram, Fig. 1 (Fig. 3 in Dr. Shoemaker's paper), were a true type of the form of all teeth, we could not gainsay what is advanced by Dr. Shoemaker as to separating such teeth; but, unfortunately, such teeth as he delineates are *not* the most common forms that are now met with. Indeed, teeth of the form he represents at Fig. 3 rarely decay, as their points of contact are so small that particles of food (the prime cause of decay) find little lodgment between them, and their very form defeats the lodgment of food by capillary attraction.

FIG. 1.



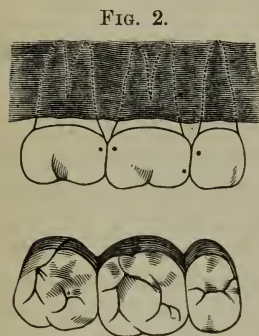
It is a fact well known in physics that the smaller the tube the greater the capillary attraction, and the larger the tube the less the attraction. In proof of this, if two plates of glass be placed side by side in a little water, the closer these plates are brought together, the higher will the water rise between them, and the more they are separated, the lower it will descend. This is a known law. It follows then that there can be little or no capillary attraction between teeth of the type chosen by Dr. Shoemaker to illustrate that decay finds a cause from such attraction, since they are widely separated at the place where the saliva collects, and only



touch at a point some distance from it; for, as he would indicate, the spaces between them act as small tubes for the attraction of saliva, and as he represents these tubes quite large at the gum and small at the points of contact, it is clear that little or no saliva can be held between teeth so shaped, and consequently no capillary attraction can ensue, according to the law of physics that we have alluded to, as demonstrated in the experiment of the two plates of glass.

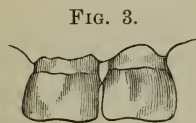
Now the teeth where capillary attraction *may* exert an influence are of quite another shape, as may be seen in the following diagram.

By comparison such teeth present a broad surface of contact, and are liable, from their shape, to draw or attract the fluids of the mouth between them, as well as the minute particles which these fluids contain. So that it will be seen that in teeth of the form given above, capillary attraction may tend to induce decay on account of the broad surfaces of contact which the teeth present to each other; whereas, such a tendency is not at all likely in teeth of the form given by Dr. Shoemaker, and capillary attraction is prevented in such teeth by the very law of nature to which



we have alluded. The aim of those who separate the teeth, therefore, is not to ruthlessly mutilate their beautiful forms, but, in an effort to correct a tendency to decay, to reduce, by cutting, this broad surface of contact to a small one, as is shown in the following diagram; in other words, to make teeth of the forms illustrated in Fig. 2 correspond in form to those given by Dr. Shoemaker in Fig. 3 (Fig. 1 of this article).

As to the statement that teeth, once developed, are constantly changing their position, I have never found this to be the case. Of course, if the teeth are cut *before* they take their position in the jaw, we can expect nothing less; but such a procedure has not been advocated, and common sense alone would dictate the inadvisability of such an operation. When teeth present a broad surface of contact they should be cut straight through from



their buccal to their palatal aspects if in the upper jaw, or from buccal to lingual if in the lower jaw, and down to a point of contact over the gum (see Fig. 3). If such an operation be properly performed in the incipient stages of decay, and the cut surfaces are well polished, decay will never recur; the patient will be subject to less discomfort than is caused by filling the teeth, whether the filling

be small or large; the operation will be painless, if made in anticipation or even in the incipient stages of decay, and it will be permanent. The expense of such a procedure will be trifling; the strain on both patient and operator will be infinitely less; and the result will be in every way more satisfactory than the more beautiful contour fillings. This is not a hobby with me, but the result of patient thought. I began the study of dentistry in 1847, and all through my pupilage and early days of practice until now, in my maturer years of calm reflection, I have seen and see no good reason to change this mode of practice. Contour work, all must admit, is beautiful; but contour work on teeth with broad surfaces of contact will fail, it is to be feared, even if done faultlessly.

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## PROCEEDINGS OF DENTAL SOCIETIES.

### AMERICAN DENTAL ASSOCIATION—TWENTY-FIRST ANNUAL SESSION.

THE twenty-first annual session of the American Dental Association was held in Irving Hall, New York, commencing Tuesday, July 12, 1881. President, C. N. Peirce, of Philadelphia, in the chair.

#### FIRST DAY.—*Morning Session.*

After the usual routine business, the president read his annual address, some of the more prominent features of which are embraced in the following abstract:

Alluding to recent overtures looking to the recognition of dentistry as a specialty of medicine, as showing that it has attained a definite position in the ranks of the healing art, the speaker pointed out a possible danger to be apprehended from the proposed union. One of two conditions must follow. Either we shall go forward or we shall retrograde. To stand still is impossible. Heretofore our progress has been steadily forward. Will the proposed union hasten or retard this progress? The history of parasitic existence exhibits, as a rule, retrogression and degeneration. Such it is to be hoped will not be the fate of this body should it unite with any other organization, though it is within the range of possibility. We can unite with the medical profession to their and our advantage, but it must be on the basis of appreciation of knowledge acquired as the result of industrious, patient, and original research. The late movement on the part of some of the medical schools in adding chairs for instruction in dentistry would be entitled to greater confidence had the medical profession shown an appreciation of the requirements of the dentist, and of the manifold problems arising from the anatomical and physiological relations of the teeth. That

it never has appreciated these requirements, and does not now, is made patent by the fact, that upon a very partial and very limited medical education, its colleges are yearly conferring degrees in dentistry, with all the rights and privileges pertaining thereto, while the ophthalmologist, the dermatologist, the obstetrician, and the gynecologist, and the aural surgeon as well, must take the full course in medicine and receive the degree of M.D. before they can be recognized as practitioners of their specialties. Are there in the practice of any one of these specialties sympathetic nervous relations more serious than those accompanying many conditions of the teeth, and especially those occurring at the formative and eruptive period of dentition, during which it is an undisputed fact, that the greatest number of deaths occur among children? Reciting briefly the advances made as evidenced by the character of the papers presented by some of the sections as compared with the discussions in the earlier years of the association, Dr. Peirce called attention to the general neglect of the study of the causes of dental decay. But little has been written, and nothing systematized or formulated respecting the etiology of the almost universally prevalent disease which results in the destruction of tooth-tissue. He suggested that the section embracing etiology organize a voluntary committee to commence at once a careful and systematic investigation, with the view of ascertaining, as far as possible, the causes which contribute to the existence of dental caries; in the belief that in a year or two it will be quite possible for this body to say to the public that there are certain physical, mental, moral, and dietetic causes which are contributing, both directly and indirectly, to the prevalence of this condition.

The following amendments to the constitution offered last year were adopted:

To add to section 5, article III., under the head of "Permanent Members," that after the resignation of a member has been accepted, the association may at any time thereafter reinstate such member by unanimous consent.

To amend section 1, article VI., so that the first sentence shall read, "To prepare, arrange, and expedite business, this association shall be divided into seven sections as follows."

And to change Section 5 to Anatomy, Histology, and Microscopy.

And to add Section 7, Physiology and Etiology.

The rest of the morning session was devoted to routine business.

Adjourned to eight o'clock p. m.

#### FIRST DAY.—*Evening Session.*

Section III., Dental Literature and Nomenclature, presented a report which was read by permission by Stephen Pearl Andrews. This report was a continuation of those of the previous years, con-



taining a further development of the system of nomenclature advocated, which it was stated was not confined to dentistry, or even to physiological science, but was a system to obtain a universal technology for all sciences.

The paper was laid over until the other division of the Section, Dental Literature, should report.

Section IV., Operative Dentistry, was called, and Dr. Webb presented a brief report recommending the reading of a paper on "Cylinder Filling," by Dr. G. J. Friedrichs, and the discussion of the following subjects: Root filling; alveolar abscess, how treated; arterial nœvus, how treated; styptics in dental practice; the mallet—a dangerous weapon in the process of filling teeth; artificial crowns.

Dr. W. H. Atkinson had advocated the saving of pulps at the time when they were destroyed wholesale. He had seen marvelous operations in gold, showing an earnestness of purpose to get the instruments clear to the apex, and be sure that the canal was filled to that point. But the proportion of those who had the requisite qualifications to do this class of work was so small as not to be worth mentioning. It makes no difference what you fill with, if you hermetically seal the entrance to the pulp-cavity. His first love as a disinfectant for pulps requiring it was creasote. He now believes that oxyphosphate is the best material for filling, being sure to thoroughly disinfect. His usual method was to drill out to the apical opening, forming a shoulder at that point, fill with oxyphosphate, and cover with gold. If an abscess appears to form, raise the lip, and with a pellet of cotton saturated with chloroform obtund the tissue; then with a sharp lancet cut down to the cement at the apex. You need not even dress it, and you will have no further trouble.

Dr. I. J. Wetherbee, Boston. We might infer from Dr. Atkinson's remarks that there has been culpable negligence in the treatment of pulpless teeth. There is a great diversity of opinion among dentists as to the proper management of pulp-cavities. Some think that gold is most excellent and that it may be used in all cases. A solution of gutta-percha in chloroform is also used, as it can be forced up to the apical foramen without difficulty. Os-artificiel and the chlorides are forced up with a piston, and when hardened are supposed to make a permanent operation. He differed with the advocates of this plan; first, because you cannot be sure that the material has been forced to the foramen; and second, because even if you do get it there, you cannot be sure that it will remain intact. His observation led him to believe that oxychloride, being an absorbent, gradually lost its hardness and became disintegrated to a greater or

less extent, because it takes up moisture from the substance of the tooth, or through the foramen from the soft tissues surrounding the end of the root. Gutta-percha in chloroform is probably better than the oxychlorides, because it is not an absorbent, but he preferred gold when there is room for a skillful hand. An operation in gold takes more time in the performance, but who is to count his time when the highest good of his patient is to be served? You can go clear to the end of the root, and wherever you can carry gutta-percha or oxychloride, you may carry gold with care. He denied that oxychloride or gutta-percha was of more therapeutical value than gold.

Dr. Atkinson denied that he had spoken of oxychloride in this connection. What he had advocated was oxyphosphate. All who know anything about the matter, know that oxyphosphate will set even under water or saliva. You need not be afraid of going beyond the end of the root, if you are careful that you do not carry a poison or a ferment. He has himself gone a quarter of an inch outside without causing bad results. To know when the canal is filled clear to the end, take an instrument with a little hook on the end, pass it up the root, and get the exact depth; then take another and pass a pellet of cotton saturated with oxyphosphate; with a bur-drill two or three sizes larger than the canal, enlarge it; pack the oxyphosphate tight down as far as you wish, and cap with gold.

Dr. H. J. McKellops had called special attention to this matter several years ago, and has for seven or eight years given it special study. He had tried Dr. Atkinson's plan, and had found roots where it was impossible to get the oxyphosphate to the end. The way in which he was enabled to fill perfectly every canal that presents is to take a fine broach and work into the canal a solution of gutta-percha in chloroform, a little at a time, and as soon as he has enough in, he takes a piece of the gutta-percha, not softened, cut to a point, and using it as a sort of piston, forces the softened material to the end of the root. The chloroform soon evaporates and you have a perfect filling, and the gutta-percha being insoluble there is no danger of disintegration. It makes no difference how fine or how tortuous the canal is, you can with care force the solution clear to the end of the root. Patients will show when the gutta-percha reaches the end. This operation does not take one-sixteenth part of the time that gold does, and he would guarantee, that if it were given a fair trial, not a man would use oxyphosphate or gold. He believed that gutta-percha, being more compatible, is not liable to produce irritation.

Dr. W. C. Barrett, Buffalo. Where there are no complications or marked deflections in the course of the canal, Dr. Atkinson's plan with oxyphosphate makes a most beautiful operation. But when the

root is crooked, mischief will be done by attempting it. Especially is this apt to occur in the anterior root of the lower molars, where the canals are frequently crooked. He contended that gold could not be used in such teeth. He fills no roots except with gutta-percha in chloroform, as recommended by Dr. McKellops, and finds the operation so easy that he marvels it is not universally adopted. The material can be forced to the extremest point of the root with a pellet of cotton on the end of a small broach. As showing how readily the solution may be forced into even the minutest canals, he had formerly filled after this method, a root of a tooth of very loose, histological structure, from the surface of which the gutta-percha exuded in minute threads. It is more compatible with tooth-substance than any other material, and is the only thing which will not clog.

Dr. Truman W. Brophy, Chicago, spoke of the nerve-reamers invented by Dr. Talbot as supplying the means required to enlarge the canals. The points do not cut, and by their use crooked canals can be made straight, without danger of making a new opening at the end of the root. When properly reamed out, the canals can be filled with gold. There ought to be no difficulty in getting room to operate. If oxychlorides or oxyphosphates are used it is not difficult to make them set as slowly as is required by mixing them thin enough.

Dr. G. F. Waters, Boston, thought the methods spoken of would meet the ordinary cases as found in adult teeth; but what are we to do when the patient is a boy or girl in whom the tooth has not yet had time to form a foramen, but is an open funnel—as where a portion of the tooth is broken off by a violent fall, and the remainder is driven upwards into the process, crowding upon the vessels and the pulp? He had a case of a boy in which both upper centrals were broken, one across the lower edge of the pulp-cavity, exposing pectinated portions of the pulp; the other was broken across diagonally, exposing the pulp for some distance and causing the horns to bleed. The former was covered with oxyphosphate which was allowed to remain several days, causing no pain, but the pulp eventually died. In the tooth where the horns of the pulp bled, the exposed parts were dressed with carbolic acid, and oxyphosphate applied, but there was great difficulty in keeping it in place; finally by perseverance it was so placed as to be retained for twenty-four hours. There is now no exposure of this pulp.

Adjourned.

(To be continued.)

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The annual election of the association was held on Thursday



evening, July 15, 1881, and resulted in the choice of the following officers:

*President.*—H. A. Smith, Cincinnati.

*First Vice-President.*—W. C. Barrett, Buffalo.

*Second Vice-President.*—G. J. Friedrichs, New Orleans.

*Recording Secretary.*—Geo. H. Cushing, Chicago.

*Corresponding Secretary.*—Albion M. Dudley, Salem, Mass.

*Treasurer.*—W. H. Goddard, Louisville, Ky.

*Executive Committee.*—C. N. Peirce, Philadelphia; F. H. Rehwinkel, Chillicothe, O.; F. M. Odell, New York.

Cincinnati was selected as the place for the next meeting.

### NEW YORK ODONTOLOGICAL SOCIETY.

REGULAR meeting held at the residence of Dr. D. H. Goodwillie, Tuesday evening, April 19, 1881.

President, Dr. W. A. Bronson, in the chair.

#### INCIDENTS OF OFFICE PRACTICE.

Dr. W. H. Dwinelle. I desire to fulfil the promise I made at our last meeting, that I would confirm by reference to the records some statements I made on that occasion on the subject of the recalcification of dentine. The question was, whether dentine was capable of being recalcified. It was argued that it was possible and practicable, although it was supposed to be of recent recognition, and I took occasion to refer to the fact that many years ago I had related my experience in that direction in corroboration of the idea. I stated then and there that it was in the early part of the forties. I see by the file of the *American Journal of Dental Science*, that it was in 1846 that I wrote an article on the subject, referring, I think, to cases and treatment in 1842 and 1843. We shall find this to be the case before we get through. In that early day, it was considered that the exposure of a pulp necessitated its destruction. I advocated the saving of the pulp. It was particularly enjoined upon all practitioners to remove every particle of decay from the teeth. That very frequently necessitated uncovering the pulp of the tooth. Decay of the teeth, as we all know, is the result of chemical action, and, strictly speaking, is the loss of a portion of the lime-salts of the dentine. I wrote an article on the subject, in which I advocated leaving a portion of partially-decomposed bone within the tooth, whenever the removal of the same would expose the nerve, expecting that in time this natural nerve-capping, which had lost a large equivalent of its lime, would be recalcified. I was ridiculed

and severely abused for advocating this practice. Years afterwards, our worthy and lamented friend, Dr. Arthur, in a series of articles in the same journal, advocated the same practice, being unaware, I have no doubt, that an article had been written by me upon the same subject some ten years previous. He was too dear a friend for me to wish to wound his feelings in any way, directly or indirectly, so I resorted to an expedient for taking the wind out of his sails without his being sensible of it. I wrote an article on "Deep-Seated Caries," in which I took occasion to say that some ten years previously I had been heartily abused for writing an article promulgating such a doctrine, yet I now congratulated myself that one of the ablest men in the profession indorsed the theory and practice I had advocated so long before. Here is the volume containing the first article, published in 1846, but which I will omit reading from, as it is all embraced in the second article, which I will now read:

[From the *American Journal of Dental Science*, April, 1852, page 422.]

"ON THE TREATMENT OF DEEP-SEATED DENTAL CARIES."

"From time immemorial it has been the highest aim of art to imitate nature. She has ever been the great example which we may continually approach, yet never reach; and those productions will ever be considered most perfect which most nearly resemble her own.

"The sculptor, who has produced the faultless form, is inferior to him who clothes his statue with a living sentiment, and makes the 'marble to breathe;' yet man, the handiwork of the Divine, is infinitely superior to them both. . . . Above all triumphs of skill,—and they are great triumphs,—nature still stands pre-eminent, above all art. . . .

"The nearest assimilation to nature is the highest point of perfection, and when we have secured the preservation of the teeth at the expense of the nerves, we cannot but concede that we are at least *one* remove (and we cannot estimate this) from that complete triumph which would enable us to contrast a living with a dead organization. Though we have discovered much, and may still more, in regard to the character and functions of the nerves of the teeth, they may have a thousand hidden influences and uses we 'wot not of.' Here, then, is the highest assimilation to nature! Here, the loftiest triumph of art! She is restored and preserved in the exercise of *all* her powers, whether they be of resistance to morbid influences from without, restorative upon herself, or reflective upon the whole system.

"In view of the fact of the great importance of reclaiming and securing teeth at the highest point of perfection, I propose to take into consideration an extreme class of teeth, which, until within a few years, have been suffered to perish, or have been indiscriminately removed. I refer to that class of teeth whose bone has been suffered to decompose until that portion immediately over and covering the nerve has lost all, or nearly all, of its component of lime, to remove which would be to insure the exposure of the nerve. . . .

"In Vol. VII. (1846), page 74, of the *American Journal of Dental Science*, will be found an article 'On the Preparation of a Cavity of a Tooth Preparatory to Plugging,' in which I advocated what was then considered a new and very unorthodox method of leaving decomposed bone immediately over the nerve,

when its removal would expose it, and then proceed to fill it as usual. After giving a description of the extreme cases in which I felt justified in the operation, I proceeded as follows: 'Under circumstances like the foregoing, after having thoroughly cleaned the walls and such parts of the bottom of the cavity of the tooth as I can safely do without interfering with the nerve, I wash out the cavity with a solution of soda, and then proceed to fill the tooth in the usual manner, taking care, however,—especially if the parts are much softened immediately over the nerve,—to skillfully build an arch over that point, so as to enable it to resist the necessary pressure of filling, finishing, etc. . . .'

"In considering teeth treated in the manner described, the question very naturally presents itself, '*Does the decay go on?*' I answer emphatically, no! The decay is entirely a chemical action, and depends upon *external* agencies alone for its progress, such as air, water, and such other influences as will promote a constant acidulated and decomposing action. The *decay* possesses no quality in itself of advancement, and when the cavity within the tooth is so completely and skillfully closed as to cut off all communication from *without*, it is as impossible for the decay to advance as it would be if the nerve were capped with bone of the purest whiteness. . . .'

"The fact that the nerve is constantly receding with the age of the patient, to say the least, encourages our operation; and, if our work is skillfully performed, and does not interfere with the internal membrane of the tooth, so as to cause inflammation, justifies us in the conclusion that it is permanent and complete.'

"Although the new doctrine was kindly received by most of the profession, it met with ridicule from others, accompanied by silly untruths and ridiculous hypotheses. In opposition to years of actual experience, one who disclaimed all personal knowledge or experience in my method of practice, vaguely remarks that the safety of the tooth would be jeopardized by the partially-decomposed bone, or cartilaginous portion *drying down* and occupying less space than when the tooth was filled.

"Subsequently, in a letter to the Baltimore editor of the *Journal*, Vol. VII., page 375, in defending my position, I attempted to prove that the bones are capable of great changes in their relative constituents,—at times comparatively soft, and at others hard, even to brittleness,—and yet, through all their changes, retain their identity as bone.

"A tooth may lose a fraction of its lime, and yet retain all of its essential qualities as a bone, as is manifest in the bones of different individuals, some of which almost vie with flint in texture, while others may be literally whittled with a knife. The bones of an infant contain but a comparatively small quantity of lime, and yet they possess all the essential qualities of bone,—distinct, living, organized bone. The bones of an aged person contain a much less quantity of gelatin, and yet they perform all of the requisite functions of bone.

"Of the softened parts over the nerve, I said, 'The decomposition, under the circumstances, will not go on, nor will it (the soft bone) *dry down* and occupy less space than it did before, as cartilage would, situated in a *dry place*, and entirely remote from the influence of moisture. It would not dry down, I say, especially as the tooth is not dead, and as the whole surrounding bone is of a porous quality, and the parts are immediately over a moist, living nerve.'

"In allusion to the truthfulness of my proposition, and also in my desire thereby to benefit the profession, I concluded with '*tempus discernet!*' and time has shown.

"Notwithstanding my subsequent experience had not only confirmed, but very



extensively enlarged my views in the direction I had taken on this subject, still, with the exception of an occasional word of encouragement from some of my professional brethren, nothing came under my observation to induce me to think that the profession generally would even sympathize with me in the great importance I had attached to the operation, until, as if to compensate for all of the past, suddenly and most unexpectedly I found the able pen of one of the best writers, as well as one of the best operators in our profession, advocating and defending, past all controversy, views and principles which heretofore for years I had advocated and defended alone.

"In No. III., of a series of articles on the 'Treatment of Dental Caries, Complicated with Disorders of the Pulp and Peridental Membrane,' by Robert Arthur, D.D.S., *Journal of Dental Science*, Vol. II., new series, 1852, page 1, the able author has expressed my views as well as practice, in treating that class of teeth whose nerves are only protected by a layer of decomposed or partially-decomposed bone. . . .

"Indorsing anew the principle laid down in my communication to the *Journal* in 1846, I repeat that the decay of the teeth is a chemical action, and depends upon external agencies for its progress. . . . That the decay possesses no quality in itself of advancement, etc., etc.; in brief, when in the course of excavating a cavity, preparatory to plugging, if, in my opinion, decomposition has so far proceeded as to reach the membrane of the nerve, and yet has not materially affected its healthful condition, and which said softened and decomposed bone, if removed, would insure the exposure of the membrane or nerve, I invariably proceed to fill the tooth, leaving a portion of softened or decomposed bone immediately over the nerve. I am particular to thoroughly excavate the walls and such parts of the bottom of the cavity of the tooth as I can do with safety; and if any material pain continues in the tooth when I have ceased to excavate it, I dip a pledget of cotton in a concentrated solution of spirits of camphor, and apply it within the cavity, let it remain for a short time, then wash it out with a weak solution of soda, dry it with soft paper, and proceed as usual. If the soft parts are much sensitive to pressure, I either over-arch them with foil, or protect them with a concave cap of gold plate, so as to leave a slight space between it and the bone, immediately over the nerve. I often let this space be filled with some non-conductor, such as asbestos, liquid cuticle, or wax.

"Whatever of decomposing agencies may be left in the softened parts are either neutralized by treatment, or soon exhaust themselves. Every avenue being cut off from all external influences, all further decomposition is arrested. Nature, aided by art, is left surrounded by the most favorable circumstances to recuperate herself. The *natural* condition and relation of all the parts; the invariable changes of time; the 'common law' of physiology, all favor and promote the end. The decomposed or softened bone over the nerve, after it is properly treated, is the best possible covering for it; of itself, it is a non-conductor, and, though partly wanting in vitality, nature does not regard it as extraneous. It adapts itself to the nerve as no artificial substance can, and finds that delicate boundary-line where the living and semi-vitalized organization blends into and reposes unharmed upon the dead.

"Repeated experiments have proved beyond doubt that this very decomposed bone,—which, by the way, is not always discolored,—if protected by a proper filling, will ultimately receive, by absorption or deposit from the nerve, a sufficient quantity of lime to compensate for its loss, and to render it as bony and compact as before. There are other reasons for believing that this effect may be

produced artificially from without. Every one knows that the nerve-cavities of our teeth are being constantly filled up and diminished by osseous deposit,—that the nerves of the teeth are continually receding with our age,—so that ultimately the nerve-canal becomes entirely obliterated.

“All of these circumstances combine as aids to the success of our operation; while, in addition, ‘nature is ever busy, by the silent operations of her own forces, endeavoring to overcome disease,’ and is continually gathering new energies to resist attacks upon her citadel.

“Since 1845 I have frequently removed gold stoppings from teeth which were filled upon softened bone, as described in this article,—teeth that were filled from one to seven years before,—and I have invariably found the former softened parts as hard and insensible as the surrounding bone. . . .

“I shall venture, before leaving this subject, to present a few cases from my ‘case-book,’ treating each one as far as my knowledge of it extends.

“May 6, 1845.—Plugged with gold first right superior molar for Miss M., aged sixteen. Cavity large and quite sensitive; over-capped with light yellow, soft, partially-decomposed bone, yielding to the touch, and exceedingly sensitive to pressure. Removed all I could of it with safety, treated it with camphor, built an arch over soft parts with foil, and completed the operation without pain. Directed the patient to call next day.

“July 7.—Miss M. called to-day; was unexpectedly called out of town the day after her bad tooth was filled, the reason why she did not call as directed. Says her tooth feels perfectly natural, and has given her no pain, aside from being sensitive to cold and warm drinks, but thinks this is wearing away.

“September 19, 1846.—To-day plugged a large cavity in front approximal surface of first inferior left molar for Mrs. Y., aged twenty-six; nerve nearly exposed, only covered by soft, discolored bone, yielding and elastic to touch; soft parts very sensitive to pressure, but not sensitive when undisturbed. Dosed it with concentrated camphor for a few hours, then proceeded and filled it as usual. Operation perfectly satisfactory in all respects.

“June 25, 1849.—Mrs. Y. called at my office to-day to have several teeth treated and filled. Consented to let me remove the large plugging I inserted in her lower molar tooth, in 1846. She states that the tooth had never given her the slightest inconvenience. On removing the gold, I found the walls and bottom of the cavity clean and dry. Was gratified to find the slightly discolored bone over the nerve very hard, giving off a crepitant and ringing sound as a cutting-instrument passed over its surface. It was insensible to pain, even when pressed severely with a blunt instrument. The soft parts have evidently received back their quantum of lime. The thickness of the plate of bone between the cavity and the nerve has manifestly greatly increased. Re-plugged the tooth without inconvenience.

“December 20, 1849.—To-day removed twenty-one teeth and roots for Mrs. H., aged thirty-two. In 1844 filled second left inferior molar on grinding-surface; cavity very large; excavated nearly all of the bone within the crown. Parts just over the nerve, soft, yielding, discolored, and very sensitive. Treated and plugged as above. Removed this one among the rest, though it was entirely free from decay, and the plugging was as bright and firm as ever, for the reason that all the rest of the teeth are so much decayed and diseased, they are past remedy. She desires a full set, and, under the circumstances, I feel justified in removing this with the rest. Held a *post-mortem* over the victim tooth. With a watch-spring saw, I cut the tooth in twain from grinding-surface, through gold

stopping, nerve, and roots to apex. The appearance of the exposed sectional surfaces of the different internal parts of the tooth was quite interesting. The nerve was living and healthy. The gold stopping was all that I could desire, and had accomplished all that could be expected. But what was most satisfactory, was the appearance of the plate of bone between the gold and nerve. Here were two layers or strata of bone, that next to the bone of a yellowish cast, corresponding to parts which, in 1844, were 'soft, yielding, discolored, and very sensitive,' but now hard and strong; between this and the nerve-cavity was a layer of bone of pearly whiteness. This last, in my opinion, has been deposited or secreted during the last five years.

"November 16, 1850.—Miss M., now Mrs. F., called to-day; filled several teeth for her; says the tooth in which I sealed up decay, in 1845, is now one of the best teeth she has; feels perfectly natural. For years it has not been sensitive to cold or warm drinks. It gave every indication of full vitality, good color, no appearance of decay, and the large and polished surface of the gold stopping is as perfect as when it was first completed; the joints between the gold- and tooth-surface as unbroken, impervious, and perfect as ever.

"February 24, 1852.—Mr. C., aged thirty-eight years, called to-day; brought a vial to me containing two teeth which he had lost by a kick from a horse. I found one to be a right superior cuspid—one which I treated in 1847, by filling over decomposed bone overlying nerve. I recollect the tooth, after being filled, required considerable treatment in consequence of inflammation supervening. On cracking open the tooth, found the nerve was evidently living at the time of the accident, but that the pulp-cavity, the *head* of the nerve, was nearly filled with movable osseous granules, probably induced by inflammation after the tooth was filled. The gold stopping in the tooth was every way satisfactory."

"I will give one more case; more particularly to exemplify a hint I have given in another part of this article. "In 1844-45, I tried many experiments with an amalgam of mercury and silver. A friend of mine called one day to have a molar tooth, much decayed, extracted. I induced him to let me try the effect of an amalgam filling in it, for the purpose of watching its influence, etc. The tooth had nothing but the shell of the crown left, and was quite sensitive; but, after much patience and more time, I succeeded in removing nearly all the decay from the walls of the tooth, and a part from the bottom of the cavity. I filled it as well as I could with amalgam, with the intention of removing it in a few weeks, even though the pain ceased, for the purpose of noting the effects of the article, which, of course, I did not regard with much favor. Next day I saw my patient, who informed me that the tooth had given him no inconvenience. A few weeks afterwards he went to Havana, thence to Europe. I did not see him again until his return in 1848; was surprised to learn from him that he still retained the amalgam tooth, though he said it had become loose within a few months. It had probably ulcerated, though he did not know it. I removed the tooth, found the nerve dead; but, on removing the amalgam, I was surprised to find the decay had not advanced since it was filled, and still more surprised to find the soft parts which I had left in the tooth, though quite dark, were completely *fossilized*, being exceedingly hard, even flinty, and when cut, leaving a bright, glittering surface. I could not satisfy myself that the pulp-cavity had diminished since the operation.

"Since then, I have made it a practice to particularly examine amalgam-treated teeth, and have often been surprised to find parts that were evidently once softened by decay had become *fossilized*, as though the soft parts had absorbed a



portion of the black metallic oxide thrown off from the mercury and silver, so as to arrest decay; as though, in fact, a kind of *embalming* process had transpired. Query.—May not a useful hint be gathered from this? May not the dead bone,—that intermediate layer in a carious tooth which must ever overlie and blend into the living bone,—may not this be fossilized by external application of harmless substances? I am no advocate for amalgam, but am willing to receive a good hint from any source, and shall some time pursue this subject further."

Thus it will be seen that this theory of recalcification, and the practice ensuing thereon, although brought forward to-day as something new, was in reality known and published to the profession nearly forty years ago.

You will remember that at our last meeting I asked Dr. Heitzmann if I were right about the fossilization and embalming process. He disclaimed it, and said it was recalcification, nothing more and nothing less, and that fossilization was a fancy.

Dr. G. A. Mills. When you treated deep-seated caries, did you recognize the necessity of destroying the bacteria?

Dr. Dwinelle. I do not think bacteria troubled us much in those days. If any man had spoken of them, we would have thought he was a subject for an insane asylum.

Dr. Atkinson. But you did give them a dose of soda?

Dr. Dwinelle. Yes, sir; we "went back" on them without knowing it.

Dr. D. H. Goodwillie. Soon after I entered practice, I took up the subject of dentinification pretty earnestly, and it awakened this question: Why not help nature in her endeavor to repair the breach made in the dental tissue? I soon found a patient who was willing, and who could give his time and attention to the experiments. I found in his mouth several pulps exposed. In one case the pulp had inflamed and bulged into the cavity of decay. I excised a portion, taking out a V-shaped section of the pulp. It fell together. Then I filled over the pulp-chamber with Hill's stopping. At the end of one year I removed the filling, and had the great satisfaction of seeing the pulp entirely covered with bone. That experiment convinced me that it is necessary in all cases to protect nature in her endeavor to repair broken tissue. It has been my practice always, not to allow any metal to come in contact with the dentine of the tooth. We know that metals—particularly the amalgams—are conductors of thermal and galvanic changes, and must have an irritating effect upon the pulp. The gold should only answer to the enamel of the tooth. Let some other non-conducting material be used for filling the bulk of the cavity. In those days we had only gutta-percha and Hill's stopping. There are some other better and harder materials now as a foundation for the gold. I pass a few

specimens of osteo-dentine, taken from pulp-chambers. They range in size and number from one nearly filling one chamber to eighteen granules filling another.

Dr. Wm. Jarvie, Jr. Do I understand that you put the gutta-pèrcha over the exposed pulp?

Dr. Goodwillie. Yes, sir; right over the pulp; of course, never until I have reduced all inflammation and reduced the circulation to the normal condition. It is very necessary that there should not be any pressure on the pulp.

Dr. A. H. Brockway. I had yesterday a very beautiful case in confirmation of the idea which has been spoken of to-night. A lady came to me, for whom I capped a pulp nearly eight years ago. The cavity was a mesial one, in the right upper first molar, and the decay quite extensive. I had not seen her from that day until yesterday. She had since been in the hands of another dentist. I found by referring to my case-book that I had capped the exposed pulp with oxychloride of zinc, and she recollected that the operation was very painful. Yesterday I found, on removing the amalgam filling which had been subsequently placed there, that the oxychloride filling with which I capped the pulp was still in place, and, on removing that, I found a hard, recalcified substance, with every indication of a living pulp beneath, and no evidence of any exposure.

Dr. Kingsley. Some reference has been made to amalgam, which brings to mind a use I have been making of it for several years, and which I reported to the State society some four or five years ago. I advocated at that time that in many instances of large cavities on approximal surfaces,—of bicuspid and molars particularly,—they should be partly filled with amalgam, to be followed at the same sitting with gold, carrying out the filling to the grinding-surface of the tooth, if one desired to avoid a full amalgam filling. Without going into a lengthy discussion of the arguments in favor, or the objections that might be offered, let me say that I have seen a great many of those fillings, and have watched them with much solicitude and anxiety, but I have never seen a single instance where there has been any recurrence of decay at the cervical edge of the cavity. In nearly every case that I have seen, I have found the amalgam discolored on the surface, but the gold as bright as any gold filling, and the tooth preserved perfectly from further decay. I have been querying, why this result; whether it was attributable entirely to the fact that with the amalgam I got perhaps a closer adaptation to the cervical edge of the cavity than I would with gold, or, whether it was owing to some galvanic condition of the different metals in contact, or what? But this I do know, that sooner or later the majority of operations, under like circumstances, when

made with gold, are giving out at that portion of the cavity, no matter by whom they are made. I say a majority, not because I have had an opportunity of examining all the fillings made by every operator, but because I am constantly seeing the work of the most skillful operators in gold giving out at the point referred to within a very few years. There is not a dentist within the sound of my voice who is not seeing this almost daily, and among his own patients, if he would but have the candor to admit it. I have been puzzled for an explanation of the success where amalgam has been used in this manner. There is evidence of no shrinkage of the amalgam that is placed in the upper part of the cavity. Whatever amalgam may do under other circumstances, that amalgam shows no shrinkage after it is put in. It remains perfectly tight, and the tooth does not discolor in contact with it. In filling a tooth in this way, the amalgam occupies a third or a half of the cavity, and the gold is immediately forced into it. For some little time the gold will absorb the mercury and take up all the excess. After that ceases, the gold shows its true gold appearance, and unites or welds in the usual way. The filling can be finished as soon as the gold is packed. The amalgam will be found sufficiently hard to be finished up to the cervical edge. We see here two results: one is that the gold has taken up all the excess of the mercury that can possibly be taken from the mass of amalgam, preventing the possibility of shrinkage; and, secondly, such a filling is in a better condition to make a perfect flush edge at the cervical border. There is little or no risk of the difficulty so often found with gold fillings, of the filling standing out and forming a lodgment for foreign matters, which will end in decay, because the amalgam has not become so hard but that it can be easily brought flush with the body of the tooth. This may be the explanation of the results that I believe will almost invariably attend such operations. I spoke of this before the State society a few years since with some timidity, for the reason that there is such a prejudice in the minds of almost every one against amalgam,—and especially as the charge is often made that amalgam is only used by those who cannot put in a gold filling. It was not for the reason that gold could not be used, but because I saw gold fillings were constantly giving out, that I felt obliged to resort to something for the good of the patient, and the result has been so successful and uniform, that I feel it a duty to give somebody else the benefit of it.

Dr. G. A. Mills. I was reading the *Missouri Dental Journal* last night, and noticed some remarks by Dr. S. B. Palmer, of Syracuse, who holds the idea that there is danger coming from what we term the standard amalgams. He claims that by raising the quality to



prevent tarnishing, we are destroying one of the qualities which, to his mind, is important to the amalgam. He says the oxidation is what we want. By improving the quality we lose this; and he says that, in his judgment, the new standards that are coming out are going to disappoint a great many men. It is a query in my mind if that can be so. I will refer to a case that will please Dr. Clowes. There were two small fillings,—one in a lower cuspid, and one in the upper bicuspid,—in the mouth of a servant-girl. I took out the filling from the lower tooth, and found the pulp dead, and noticed that the tooth was very much softened under the filling. I thought nothing of it then. She also complained of the upper tooth; and I said, if it does not become quiet I will see to it. The next week she came in again, and, on taking out the small approximal filling, I found the structure of the tooth was destroyed to such an extent that it was a black, gray, and yellow mass, and the pulp was exposed. I took it to be cadmium amalgam, against which Dr. Clowes has so often warned us. I spoke to some gentlemen of this case, and they said at once, "Boston amalgam!"

Dr. W. T. La Roche. I am afraid Dr. Kingsley's example may influence the young men who are learning to fill with gold to use amalgam in the bottom of cavities, and go on as best they know how. It may do for the men who are getting old, but I fear its influence upon the young men. About seven years ago, I advocated before this society the use of gutta-percha and tin as a capping for the pulps of teeth. It seems that the profession is waking up to the necessity of filling cavities with something besides metallic substances. Since I commenced to protect the pulps with gutta-percha and tin, I have yet to see the first failure, and that, I think, is saying a great deal. I put a small portion of gutta-percha over the pulp in such a way as not to offend it, and cover this with a plate of tin. I then fill with gold. I have been very successful indeed, and I recommend it to those who desire to try it.

Dr. S. G. Perry. I warn you against Dr. La Roche's method of capping pulps. If you have his gutta-percha, which requires but little heat, and is wonderfully soft and manageable, and you also have his delicacy of touch, you may succeed; but with the ordinary gutta-percha and the ordinary method of its use, I predict frequent failures.

Dr. Brockway. While I have the greatest respect for Dr. La Roche as an operator, I do not agree with his sentiments in respect to the idea that Dr. Kingsley has advanced. If Dr. Kingsley's method is a good one, while it lessens labor for the elderly men, it will not injure the young and vigorous. I am inclined to think there is something in this idea, and taken in connection with the

theory of Dr. Palmer, in reference to the preservative property which is exercised by an oxidizable amalgam, it strikes me there is a hint we may get some advantage from. It is perhaps the practice with some of you, as it has been with me for some years, to occasionally repair those large gold fillings on the approximal surfaces of bicuspid and molars where they have failed at the cervical margin, with amalgam. It may be a reprehensible practice. It may be lowering the standard of dentistry; but, so far as my observation goes, it is a means of *saving teeth*, and that I consider is the object which should be aimed at. I had in my chair to-day a patient for whom I performed such an operation three or four years ago, on the distal surface of an upper first bicuspid. To-day, in working on the mesial surface of an adjoining second bicuspid, I had a good opportunity to examine the other, and I found the combination filling in perfect condition, with every appearance of continuing so.

Dr. Kingsley. The question is not a question of ability to pack gold. It is narrowed down to simply this,—that a majority of the fillings in the circumstances described, coming from the hands of the very best operators, are failing, and here is a method that holds out the hope of saving such teeth from further decay at that point. It is something for us to adopt for the benefit of the patient, without reference to the effect that it may have upon the manipulators of gold.

Dr. J. W. Clowes. It seems amalgam is not without recognition here; that members of this society favor its use, and that notably, Dr. Kingsley is very strong in the same direction. Although an advocate for amalgam myself, I urge all who love their profession, to acquaint and acquit themselves well with gold. I assert, with emphasis, that any one, whose capacity is *unequal* to the skillful manipulation of gold, will, of necessity, be faulty in the application of amalgam. Gold and its peculiar requirements are teachers, and we *must* enter by that way into knowledge. The scoffer declares all this to be “nonsense,” that these preliminaries are “quite unnecessary,” and “pooh-pooh’s” and talks of “putty.” The strength of a hill may be in its ruggedness and bluff, but above these are the calm view and the clear perception!

The *partiality* a patient may entertain for an amalgam filling, was shown some time since in my office, by a lady whose teeth had been filled for at least a quarter of a century when, for appearance’ sake, I advised a change to gold. By this I really believed the conditions were bettered, and that I deserved approval; but ever since it was done, she has thought otherwise,—berates me severely; and calls herself “goose” for having yielded assent.

Another lady, with the most rigid and conservative views, upon my proposing to fill a cavity with amalgam, informed me that *noth-*

*ing but gold would do for her.* To this announcement I replied that sufficient time had not been reserved for filling with gold, but if she would allow a temporary use of amalgam, when she came again, it should be changed. At her next visit, I proceeded to fill a corresponding, though somewhat smaller cavity with gold, and *then* observed—"I will *now* remove the amalgam, and ——" But before I could say more she exclaimed: "*Oh! no—don't remove it, I prefer you should let it remain.*" The rigid bias, and the sentiment against amalgam had vanished; *the light of experience had shone; the old love and the absurd prejudice had together passed away.*

Gutta-percha, is a substance most *congenial* to the gums and eminently *harmonious* when in contact with other living tissues. An agreeable expression of these qualities was given a few years since, in the following incident of practice: A lady had broken, not only the crown of a superior central incisor, but had also split its root nearly to the apex, and then came to me to have an artificial insertion upon the remnant. With the most delightful assurance she requested me to proceed with the work. I modestly declared my limited capacity, and decried the possibility of holding by a rent root. "Ah," my patient said, "Why do you discourage me? You *can fasten* a tooth for me if you will." By way of proving that *it could not be done*, I fitted a rough, wooden-pivot to a porcelain crown, warmed and attached sufficient gutta-percha to fill the space defined by a fragment of the root on one side, and the wall of the alveolus on the other, and pressed it home. I certainly expected that tooth to fall out before my patient left the house, but it did not. Several weeks later, she called to "render special thanks for the nice tooth I had set her, and said it was a perfect success." "Well," I remarked, "*this is a clear case of insertion by faith.*" "Yes," she replied, "the faith I have in you." Pleasing as this compliment was to me, its true mission was in opening the door to increasing knowledge; and through the years, since then, *no adverse report has come back to set aside the verdict of simple faith, or arrest the progressive steps that faith inspired!*

Dr. Jarvie. I should like to call the attention of the society to this model that has been passed around. It is that of the mouth of a boy nearly seven years of age. All the temporary teeth are in place, and yet there are two peg-like teeth showing themselves just back of the central incisors. They have been there eighteen months. The enamel is hard and healthful. There is no indication whatever of the early appearance of the sixth-year molars. It is the only case of the kind I ever saw.

Dr. Clowes. Extract them.

Dr. Abbott. I want to say one word about the use of gutta-percha



over the pulps of teeth. It may possibly be true that men succeed, as they think they do, in applying gutta-percha over the pulps of the teeth, but I can not do it. I never attempted a case that I did not have the pulp die. I believe they die nearly every time, and I want to warn you, as Dr. Perry did, in relation to Dr. La Roche's gutta-percha. I have used a great deal of that gutta-percha, but, even with it I could not succeed. There is some secret that I do not understand. I have tried it for years, and have failed nearly every time. I must say I am done with it. I do not believe it is a success in the hands of most gentlemen.

Dr. O. E. Hill. I am very glad that Dr. Abbott has said something on the other side. I also object to the use of amalgam near the margin of the gum under large gold fillings. Here is another thing that I want to emphasize, and that is the idea that it requires more skill to put in an amalgam filling than a gold one. We all know better. We all know that it is the easiest thing in the world to put in an amalgam filling. There is no comparison between the skill required in putting in a gold and an amalgam filling.

Dr. Clowes. A man must know how to fill a cavity with gold before he is qualified to fill it well with amalgam.

Dr. D. H. Goodwillie then read a paper on "Maxillary Abscess with Complications." \*

#### *Discussion.*

Dr. Clowes. The doctor has been profuse in his reference to morbid *effects*, but, except by implication, he has left us in doubt as to the *causes* of disease. It is curious to note how frequently amalgam fillings have been mentioned in connection with the cases he has named. Does the doctor mean to say that amalgam had anything to do with their production?

Dr. Goodwillie. I have not expressed any such opinion.

Dr. Clowes. Without explanation it might be inferred, from the paper just read, that amalgam was an habitual mischief-maker, but the intelligence of this body can not afford to have so erroneous an impression go forth unquestioned. To professional minds there is nothing more essential than a full comprehension of cause and effect. Possessing this knowledge, we are men of skill and usefulness; without it, we are blunderers, or worse. It is not difficult to understand whence came the terrible ills which have been so graphically illustrated and described this evening. *They had their sources in defunct dental pulps.*

Some years since Dr. Goodwillie showed me an interesting case of osseous tumor which he had cut from the superior maxilla of a lady.

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\* This paper will be found at page 393, current number DENTAL COSMOS.

He exhibited the original suspended in alcohol, and also a copy in plaster. There were abundant evidences of skillful performance in which a magical every-way-cutting saw had been prominent. "Ah," said the doctor, while a glow of satisfaction suffused his face, "It was a splendid success, and the lady is so grateful to me for having saved her life." At the risk of disturbing this supreme enjoyment, I inquired, "What are those rough and jagged points which I see sticking up from the substance of the tumor?" "Oh! they are the root remains of dilapidated molars." "Were they not the original cause of the tumor?" "I suppose they were." That being the case, "why did you not extract them and see what would have come of it?" "Ah!" said he, "it would have done no good." How did he know it was too late when he had not tried it? It seemed to me, from the doctor's proclivities and his facilities for cutting, that he might be a dangerous man.

About this time I had a very similar case of osseous tumor on the lower jaw of a lady from New London. It had been increasing in size and density for several months, and was a matter of celebrity in that city. I may be allowed to remark, perhaps, in passing, that New London, forty years ago, was my probationary state, and in my dreams I sometimes think I am living there still, but when I awake I feel very happy that it is not so. Delightful is New London, and very salubrious. While there, the lady with the tumor had employed me professionally, and when I left she could in nowise believe she would ever employ another in my place—but she did, and when twenty-five years later, she walked into my office a high-wrought model of misery, I was informed that four others had succeeded me. *Sic transit gloria dentisti.* As she stood before me, looking so sad and racked with pain, I inquired about the case; what she had done in reference to it; whom she had consulted, etc.; and what was considered the *cause* of the trouble. "Physicians," she said, "and surgeons have examined it, and are unanimous as to what produced it, but do not agree as to any course of treatment, and I have come to ask your advice before deciding upon anything myself. *I am told that the cause is an amalgam filling in a large lower tooth.*" "Would you like," I inquired, "to have the tumor cured, your tooth saved, and be allowed yourself, in a few days, to return home well and hearty?" She had no dearer wish than that. "Would you like me to accomplish all this?" Nothing would please her more. "Listen, I will tell you the cause of your troubles, and, having done that, will proceed with their cure. Remotely, amalgam was the cause, but not in the way its traducers think. Some one of my successors in filling the cavity of that tooth, pressed the amalgam upon a bare nerve. Its presence irritated, inflamed, and destroyed

what it pressed against. Gold or tin or cotton would have done the same. The dissolved body and pestilential presence of that dead nerve are now the cause of all your woes. I will remove it from the whole interior of the tooth, disinfect every part it has occupied and refill with at least five times as much amalgam as it now contains. Thus the truth will prevail and a righteous vindication ensue." Ten days later there was no tumor left. The face had resumed its original form. There was no pain any more and no *unsightly scar* to designate the place which had known so much of physical strife.

Dr. Goodwillie. Did I understand you to say an osseous tumor?

Dr. Clowes. Yes. Perhaps I might be justified in saying it was also a nauseous tumor. I apprehend that a great many of these things that are so famous, are simple things after all.

Dr. Hill. Dr. Goodwillie says that sometimes the soft tissue loosens and falls from the plate of bone covering the roof of the mouth, and that treatment cannot be applied through the roots of the teeth that cause the trouble. I cannot entirely agree with him. The condition he describes is rarely caused by any other teeth than the lateral incisors. I have had several such cases. I have never treated them in any other way than through the canal of the tooth. If the gentlemen will remember, I read a paper before this society several years ago, in which I described two such cases which were successfully treated. I treated them entirely through the root.

Dr. G. W. Field, London. In England and Switzerland, from one cause and another, I have had occasion to remove many amalgam fillings from dead teeth. Under many of these fillings I have found no exposure of the pulp-chamber, but have found evidences of the recalcification of softened dentine which has been spoken of here to-night. I am at a loss to account for the death of the pulps after recalcification has occurred.

Adjourned.

### ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

THE annual meeting of the Odontological Society of Pennsylvania was held Saturday evening, May 7, 1881, at the residence of Dr. W. G. A. Bonwill, 1719 Locust Street, Philadelphia, the president, Dr. Daniel Neall, in the chair.

The election of officers resulted as follows:

*President.*—F. M. Dixon.

*Vice-President.*—Jas. Truman.

*Recording Secretary.*—Ambler Tees.

*Corresponding Secretary.*—S. H. Guilford.

*Treasurer.*—E. H. Neall.

*Librarian.*—W. G. A. Bonwill.



*Executive Committee.*—C. J. Essig, E. T. Darby, and Louis Jack.

A paper was read by Dr. W. G. A. Bonwill on "Adaptability vs. Compatibility."

#### HARVARD ODONTOLOGICAL SOCIETY.

THE third annual meeting of the Harvard Odontological Society was held on Saturday, July 2, 1881, at the Atlantic House, Nantasket Beach, Mass.

The following officers were elected for the ensuing year:

*President.*—Eugene H. Smith, D.M.D.

*Recording Secretary.*—Frederic E. Banfield, D.M.D.

*Corresponding Secretary.*—Edw. C. Briggs, D.M.D., M.D.

*Treasurer.*—Frank Perrin, D.M.D.

*Prudential Committee.*—Frederic E. Banfield, D.M.D., Eugene H. Smith, D.M.D., Edw. C. Briggs, D.M.D., M.D.

FREDERIC E. BANFIELD, *Recording Secretary.*

#### MISSISSIPPI STATE DENTAL ASSOCIATION.

THE sixth annual meeting of the Mississippi State Dental Association was held in the City of Jackson, Miss., May 17 and 18, 1881. Dr. R. J. Miller, president, in the chair.

The following were elected officers for the ensuing year:

*President.*—J. D. Miles, Vicksburg.

*First Vice-President.*—E. E. Spinks, Meridian.

*Second Vice-President.*—Joseph B. Pleasants, Aberdeen.

*Secretary and Treasurer.*—Geo. W. Rembert, Natchez.

The next meeting will be held in Jackson, on the third Tuesday in January, 1882. GEO. W. REMBERT, *Secretary and Treasurer.*

#### THE DENTAL ASSOCIATION OF THE UNITED STATES OF AMERICA.

THE Dental Association of the United States of America will hold its second regular meeting in Republican Hall, West 33d Street, New York City, commencing on Monday, August 8, at 11 o'clock. The Committee recommend the Sturtevant House, corner Broadway and 29th Street, as a good hotel, and as being but a short distance from the Hall. The hotel rates are reduced to \$2.50 per day. Rooms on the European plan at \$1.00 per day.

FRANK M. ODELL, *Chairman Executive Committee.*

#### AMERICAN DENTAL CONVENTION.

The twenty-seventh annual meeting of the American Dental Convention will be held at Saratoga Springs, on Thursday, the 11th day of August, 1881, at the Town Hall, commencing at ten A.M. Mem-

bers will meet at the United States Hotel, previous to organization, where rooms may be engaged in advance, at a reduction from usual rates. Rooms may also be obtained at other hotels at from \$2.00 to \$3.00 per day.

This meeting promises to be one of more than usual interest. Circulars in detail will be sent on application to either of the officers of the convention: John Allen, President, New York; C. S. Hurlburt, Vice-President, Springfield, Mass.; J. G. Ambler, Treasurer, New York; Ambler Tees, Recording Secretary, Philadelphia, Pa.; C. Fones, Corresponding Secretary, Bridgeport, Conn.

J. G. AMBLER, 25 West 25th St., New York,  
*Chairman of the Committee of Arrangements.*

### SOUTHWESTERN DENTAL ASSOCIATION.

THE second annual meeting of the Southwestern Dental Association will be held in the office of Dr. J. O. Haux, Columbus, Kansas, commencing Tuesday, August 9, 1881, at 10 o'clock A.M., continuing through Wednesday.

G. A. KEYES, *Secretary.*

### DENTAL SOCIETY OF MARYLAND AND DISTRICT OF COLUMBIA.

THE next annual meeting of the Dental Society of Maryland and District of Columbia will be held in Baltimore, commencing Wednesday, September 7, 1881.

H. M. SCHOOLEY, *Secretary.*

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## EDITORIAL.

### DENTAL LEGISLATION IN ALABAMA.

Alabama had the distinction of being the first of the States to recognize the necessity of guarding the practice of dentistry as well as medicine against the inroads of ignorance and quackery. The earliest legislation on the subject, of which we have knowledge, is the act passed in Alabama in 1840, which continued on the statute books, we believe, till the outbreak of the war. Whether any effort was made to secure its enforcement we are not informed. At the late session of the Legislature a new law was passed, the text of which will be found below:

#### AN ACT TO REGULATE THE PRACTICE OF DENTISTRY IN THE STATE OF ALABAMA.

"SECTION 1. *Be it enacted by the General Assembly of Alabama:* That from and after the passage of this act, it shall be unlawful for any person to engage in the practice of dentistry in the State of Alabama, unless said person has obtained

license from a board of dental examiners duly authorized and appointed by this act to issue such license; *Provided*, That dentists who have been in the regular practice of dentistry for five years next preceding the passage of this act, shall not be required to submit to an examination, and shall be entitled to license without fee, which shall be transmitted to him by mail or otherwise upon his application accompanied by an affidavit to the fact of his having been in the regular practice for the required time.

"SEC. 2. *Be it further enacted*: That the board of dental examiners shall consist of five (5) dental graduates or practitioners of dentistry who have obtained a license to practice dentistry from a medical board in this State, or from a dental board organized under this act, and who are members in good standing of the Alabama Dental Association; *Provided*, That said graduates or practitioners have been practicing dentistry in the State of Alabama for a period not less than three (3) years; *and provided further*, That the first board of examiners under this act shall consist of the present executive committee of the Alabama Dental Association, who shall hold office until the next annual meeting of the said association, and until their successors are elected and qualified as hereinafter provided.

"SEC. 3. *Be it further enacted*: That it shall be the duty of the said Alabama Dental Association, at its annual meeting next after the passage of this act, and every two years thereafter, to elect said board of examiners, who shall hold office for the term of two (2) years and until their successors are elected and qualified. The president of said association shall have power to fill all vacancies in said board for unexpired terms.

"SEC. 4. *Be it further enacted*: That it shall be the duty of said board of examiners:

"1st. To meet annually at the time and place of meeting of the Alabama Dental Association, or oftener, at the call of any three of the members of said board. Thirty days' notice must be given of the time and place of meeting of said board, said notice to be mailed to all practicing dentists in the State.

"2d. To prescribe a course of reading for those who study dentistry under private instruction.

"3d. To grant a license to any applicant who shall furnish satisfactory evidence of having graduated and received a diploma from any incorporated dental college, or who has heretofore received a license from a medical board in this State, without examination or fee.

"4th. To grant license to all other applicants who undergo a satisfactory examination, who shall pay to the said board a fee of five dollars for said license.

"5th. To keep a book in which shall be registered the names of all persons licensed to practice dentistry in this State.

"SEC. 5. *Be it further enacted*: That the book so kept shall be a book of record, and a transcript from it, certified to by the officer who has it in keeping, with the common seal of said board, shall be evidence in any court of this State.

"SEC. 6. *Be it further enacted*: That three members of said board shall constitute a quorum for the transaction of business, and should a quorum not be present on the day appointed for its meeting, those present may adjourn from day to day, until a quorum is present.

"SEC. 7. *Be it further enacted*: That one member of said board may grant a license for an applicant to practice until the next regular meeting of the board, when he shall report the fact, at which time the temporary license shall expire; but such temporary license shall not be granted by a member of the board after the board has rejected the applicant.



"SEC. 8. *Be it further enacted:* That any person who shall, in violation of this act, practice dentistry in this State for a fee or reward, shall be liable to indictment, and on conviction shall be fined not less than fifty nor more than three hundred dollars; *Provided,* That nothing in this act shall be construed to prevent persons from extracting teeth.

"SEC. 9. *Be it further enacted:* That on the trial of such indictment, it shall be incumbent upon the defendant, to exempt him from the penalties of this act, to show that he has authority under the law to practice dentistry in this State.

"SEC. 10. *Be it further enacted:* That every person to whom license is issued by said board of examiners, shall, within thirty days from the date thereof, present the same to the judge of the probate court of the county in which he resides, who shall officially indorse said license and seal it with the seal of the court, and who shall record said license in a proper book in his office, and who shall be entitled to receive a fee of one (1) dollar for his services; but a temporary license issued under section 7 of this act, need not be sealed or recorded.

"SEC. 11. *Be it further enacted:* That it shall be the duty of the solicitors of this State, to prosecute all persons violating all or any portion of this act.

"SEC. 12. *Be it further enacted:* That all laws or parts of laws in conflict with this act, be, and the same are hereby repealed."

Approved FEBRUARY 11, 1881.

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## PERISCOPE.

ABSCESS OF THE ANTRUM OF HIGHMORE SIMULATING ACUTE INFLAMMATION OF THE LACHRYMAL SAC.—The differential diagnosis in the following case, a certain peculiarity in the symptoms presented, and the method of treatment employed, seem to make it worthy of some notice.

The patient, J. C., was a robust fellow, twenty-seven years old, who applied for relief at the Buffalo Eye and Ear Infirmary on the 21st of last August.

The history of his case, as detailed in rather an intelligent manner, was about as follows: Some four months previously he first noticed a swelling just below the left eye. He could not say whether this was near the outer or the inner angle of the lid, but simply that it was in that region. Inflammatory symptoms gradually increased, however, pain being a very prominent one, and in the course of a couple of weeks a few drops of pus were evacuated through an opening, which formed near the center of the lower lid and about half an inch below the margin. Temporary improvement followed, but when this opening closed, the same train of symptoms reappeared, another fistulous opening formed near the first and considerable pus discharged through the nostril on that side. When the patient applied for relief, as above stated, the following condition presented: The tissues about the lower part of the left eye were considerably swollen, the concavity between the nose and eye being almost entirely filled out, and the enlargement extending almost out to the outer angle of the lid. Near its center there was a dull red spot, marking the position of the first opening, and a little internal to this, a fistula, through which pus exuded freely. The nostril on that side was entirely closed, and the patient said there was a considerable

accumulation of pus—not of mucus—in the throat every morning. The epiphora was decided, but not profuse; pain was usually severe, but varied.

Dr. Howe prescribed a weak solution of sulphate of zinc—grs. ii ad ʒ i—and instructed the patient to inject into the opening, by means of a small pipette, first, a generous quantity of tepid water, and then a few drops of this astringent solution. That was to be done once or twice a day, at least. Directions were also given to inject into the nostril on that side, a weak solution of potassa permanganate, and an anodyne mixture was given to be applied locally in case of pain. Before September 8, the discharge had lessened considerably, and the patient felt much better. On the sixteenth of that month, a piece of bone measuring about one-fourth by one-half inch was removed from the nostril, and the patient said that “other pieces like that”—perhaps one or two—“had come away.” On the 28th the fistula had entirely closed, and on October 9 the man was discharged. The situation of the opening was marked by an adherent cicatrix, about a quarter of an inch in diameter, which produced a slight deformity, but the eye and lid were otherwise in excellent condition.

In the history of this case, there are at least three points which seem to be worthy of attention. They relate to the diagnosis, the position of the openings, and the method of treatment. Very few works on diseases of the eye mention an abscess in the antrum as similar to a dacrocystitis. Schirmer\* refers indirectly to the possibility of such a condition, but most writers ignore the fact as thus exemplified, that the two diseases are liable to be confused.

We have here, however, a tumefied condition of the entire lower lid, together with pain and tenderness. The first and second openings might have been ascribed to an accumulation of pus in the lachrymal sac which had burrowed under the tissues before finding vent, and the entire closure of the nostril would have corroborated that view of the case. It is true, the absence or presence of a carious tooth, and the duration of the complaint were to be considered as important evidence in arriving at the conclusion, but altogether the diagnosis in the case could not be regarded as entirely free from difficulty.

A second point noticeable in the history of this case is the place of perforation of the abscess. A portion of the pus, of course found exit through the nostril, but it is very seldom that the hard part of the superior maxillary bone, which forms the lower border of the orbit, is so far absorbed as to allow a fluid to pass through it. At least, I find no such case recorded.

Finally, the treatment, while not so severe as that usually adopted of puncturing the bone in the vicinity of the canine fossa or elsewhere, or even of the extraction of a tooth, was, after all quite effectual. It is true, an opening into the nose had already been formed in addition to the one above, and it is also probable that only in such exceptional cases would the plan adopted by Dr. Howe be found advisable. We must, however, admit that the simple washing out of the cavity, first with water and afterwards with a mild astringent solution, is preferable to operative procedures wherever admissible. It

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\* Graefe & Saemisch, Handbuch der Augenheilkunde, Band VII.

is another illustration of the fact that we shall be better surgeons when we use instruments less if at all, and any advance in this direction, however slight, seems worthy of imitation.—*Clinic of Dr. Lucien Howe, reported in Buffalo Medical and Surgical Journal.*

ON MAXILLARY ABSCESS AND NECROSIS IN CHILDHOOD.—Mr. Edmund Owen read a paper on this subject, and stated that the question he desired to suggest for discussion was this: "Is it right to refuse to extract a carious and aching tooth, on account of the acuteness of the periosteal and maxillary inflammation which its presence has excited?" He felt that the knowledge of general surgeons on this point was by no means definite, involving, as it did, pathological and surgical principles of great importance; and he was anxious to get an opinion from those present, since he held that no surgeon should ever refuse to remove a tooth which was the cause of acute inflammation, for the simple reason that the local disturbance was excessive. He would narrate three cases by way of analogy. Case 1 was that of a little boy, in a most miserable condition, with a large bright-red or dusky swelling at the end of his thumb. He could neither eat nor sleep on account of inflammation of the bed of the nail. The nail was evidently sound, discolored, and loose and imbedded in a bleeding groove of vascular granulations. The nail was removed; water-dressings applied; cod-liver oil and iron prescribed; and the boy, from that time, recovered health and strength. No treatment which did not include the removal of the nail would have been of avail. Case 2 was that of a child, with acute periostitis and inflammation of the bone itself, with probably some periosteal suppuration, caused by exposure to cold and wet. A bold and free incision was made, which at once relieved the vascular tension, and the patient recovered. Case 3 was that of a boy, with the lower part of his face bound up, and his external ear plugged with cotton-wool. On removing the comforter, and with it a decomposing mass of moist linseed-meal, one found the cheek red and swollen. He could only slightly separate the jaws; and one noticed, on examining the mouth, that one of the molars was slightly decayed, and that the gum surrounded it with a bright red line. On pressure, a small quantity of pus welled up between the tooth and gum; and, near the angle of the jaw, there was a small opening from which matter was discharging. The boy had been previously taken to a dentist, who refused to extract the tooth "until the inflammation had gone down"; and advised the mother to keep on poulticing the cheek. Mr. Owen then drew attention to the course the inflammation followed in this last case: the local disturbance having caused paralysis of the vaso-motor nerves, the Haversian arteries became crowded and blocked with the red corpuscles. The colorless corpuscles effected their escape, together with some of the liquor sanguinis, through the thin-walled vessels, and the protoplasmic contents of the lacunæ and canaliculi took on energetic proliferation; at last, the intra-vascular pressure became unrestrainable, and, the walls of the vessels giving way, the bone became flooded with sanguineous effusion. Healthy nutrition being impossible, a portion of the jaw perished, and freed itself by linear ulceration, and remained as a sequestrum. The less the wounding of the skin, the



less the disturbance of the young teeth, as the dead piece of bone was being removed, the better. In his experience, necrosis of the superior maxilla in childhood was rare; while that of the inferior was not uncommon. In the case of the boy with the acutely inflamed tibia, it was found that the result of those free incisions had been, that it had afforded relief to the vascular and nervous tension, and also a vent to the effused products, and thus saved the compact bony tissue from a fatal flooding; and these same conditions were obtained in the case of the child with the maxillary distress. Prompt extraction would have spared the sufferer much subsequent trouble. In conclusion, Mr. Owen would venture to affirm, that whenever a child was brought for assistance, the more firmly fixed the jaws and the greater the inflammation, the more imperative it was that the irritating tooth and the vascular tension of the adjacent bone be simultaneously removed. The tissues would then settle down in quiet as happily as did the red and swollen finger-tip, when the removal of the piece of damaged nail was effected. The President remarked that it was the erring practice of some to wait until inflammation subsided; and he was a strong advocate for an early removal of the offending cause, as delay often greatly increased human suffering, and was injurious in many instances to the patient in after-life.—*Reports Association of Surgeons Practicing Dental Surgery in British Medical Journal.*

**SEVERE FACIAL NEURALGIA CURED BY A NEW OPERATION.**—In April, 1880, a lady, aged fifty-six, who had suffered many years from a most severe facial neuralgia, called upon me and implored me to do something for her relief. I shall not readily forget the careworn expression of her face as she related to me the terrible nature of her sufferings. She told me that for a period of upwards of ten years she had endured the most fearful torture from constant attacks of neuralgia, which caused her to scream, and left her in an exhausted condition; and that, although she had incurred very considerable expense to obtain relief, she had failed to do so; and that the attacks were gradually increasing in violence, frequency, and extent. She also informed me that she had been an in-patient, for some weeks, in the London Hospital, under the care of Dr. Fenwick, and that she had left that institution no better. I need not enumerate the various medicines and remedies which had been tried in this case,—ice, electricity, etc.,—for all alike had failed; even subcutaneous injections, although at first mitigating the paroxysms, began to lose their influence. Impressed by the supplications of my patient, I promised to do something for her. After considering the case for a week, I resolved upon a plan which I carried out on May 11, 1880. In this case the pain commenced in the mental nerve of the right side, just at its exit from the mental foramen; from this spot it ran backward to the front of the ear, then upward to the vertex, forward to the frontal nerve, down the right side of the face and neck to the arm, and backward to the scapula. On examining the mouth, I found the gum above the starting-point of the pain of a veined and congested appearance, thickened, and harder to the touch than the gum of the opposite side. The tongue was white and tremulous, and all the teeth had been extracted. Six

years ago she had a portion of the alveolar process removed, the idea then being that the pain was produced by the pressure of a buried stump of a tooth, but the operation proved that this was not the case. Mr. Penny and Dr. Rowntree kindly assisted me with the operation. As soon as the chloroform took effect I made an incision along the lower border of the jaw, and dissected up a flap till I reached the mental foramen. I then ran into the foramen a red-hot steel wire, for a quarter of an inch or so, and thoroughly destroyed the nerve. On withdrawing the wire, the artery bled considerably, and I was obliged to plug the foramen. This plug was the cause of some amount of suppuration and delay in the healing of the wound. However, it came away in a few days in the discharges, and then the wound healed kindly, and my patient, from that time, has been entirely free from pain, and is now restored to health. Anything more satisfactory than the result of this operation I have never known. She is now able to take food without fear, to sleep without narcotics, her tongue has regained its color, and she now takes an interest in her household affairs. Much, lately, has been said and written about nerve-stretching; but the result of this operation proves that in the cautery we have another remedy upon which we may depend, and which, in many instances, may supersede nerve-stretching; also one which possibly may be of great benefit in tetanus.—Augustus Brown, M.D., in *British Medical Journal*.

PHOSPHORUS NECROSIS OF THE FACIAL BONES.—In twenty-four cases of phosphorus necrosis, recently treated by Dr. G. Bruhns in the Moscow Hospital, and reported by him in the *St. Petersberger Medical Wochenschrift*, the necrosis affected the lower jaw fourteen times, the upper jaw six times, both maxillæ two times, and other facial bones two times. Fourteen cases were declared cured, three improved, two unimproved, and four died. The left side was more frequently diseased, which the writer attributes to the fact that the patients working with their right hands had the left side of their faces more exposed to the phosphorus vapors. He explains the rare involvement of the bones of the nose to the protection afforded them by chronic coryza, from which all of these artisans in match factories suffer. The writer agrees with most modern authors in claiming that the use of yellow phosphorus is responsible for the occurrence of these manifestations.

The first symptoms to arouse suspicion of the poisoning are caries or yellow discoloration of the teeth, then swelling and inflammation of the gums and periosteum; sometimes, however, the teeth are still perfectly sound, while the jaw is necrosed. The resulting osteophytes, usually of a very porous character, never form a closed capsule; the latter is always open above. Sometimes total necrosis takes place without the formation of any osteophytes.

Of course, the proper plan, though seldom possible, is immediate discontinuance of work upon the first manifestations of poisoning.

On the subject of operative interference, the writer differs from the great majority of surgeons, when he advises against early surgical procedures. For this he offers various reasons, chief of which is that the late operation is the least dangerous. Among twenty-one cases operated upon, twelve were in the early stages, and four

died; while no deaths at all occurred after the late operation. The lower jaw was entirely dead and was removed *in toto* four times. One of the cases narrated in the original report is worthy of notice from the fact that in it both of the upper maxillæ, the palate bones, the nasal bones and the pterygoid process of the sphenoid bone, were found necrotic and were removed.

The writer closes his communication by expressing the hope that his own country will very soon follow the example recently set by Switzerland, where the use of the yellow phosphorus is prohibited by law. In addition to this, much might be gained by a proper regulation of the hygiene of the factories themselves. His personal investigations showed him that in some manufactories the phosphorus is melted, the wood cut, dipped and dried in the same badly-ventilated room.—*Cincinnati Lancet and Clinic*.

**MOUTH WASHES IN ILLNESS.**—A severe strain upon the system is often accompanied by increased decay of the teeth. For example, one sees this increased decay even during the physiological process of reproduction, after a period of financial depression, during the protracted illness of some dear relation, after a sojourn in foreign countries, and during recovery from acute exhausting diseases.

As in some of these conditions the general practitioner is likely to have the patient under his care, I wish to suggest the importance of prescribing for the teeth as well as for the general condition.

No doubt in many acute cases danger to life may overshadow minor considerations, yet this is usually for a limited period.

Among the more immediate causes of this decay, diminished power of resistance in the teeth ranks first; others are vitiated oral secretions, neglect of the ordinary mechanical means of cleaning, thus allowing food and the waste products of the mouth to accumulate. Aside from constitutional treatment to build up the system, the indications for local treatment are increased care in cleaning the teeth, together with the use of suitable washes to prevent decomposition, neutralize acidity, and destroy germs if these have any part in decay. As in acute prostrating diseases the patient is too weak to brush the teeth, reliance is to be placed on the frequent use of a mouth wash. Nor will any difficulty be found in this, as even in severe prostration the muscles about the mouth remain strong.

As examples of mouth washes the following are given. The use of carbolic acid alone, or in combination with an alkali, can seldom be resorted to, because patients associate it with unpleasant places. Benzoic acid, thymol, eucalyptus oil, or boracic acid, answer the purpose, and some one of them is generally agreeable to the patient.

1. R Sodæ boratis, 15 grams.  
Thymol, 200 milligrams.  
Aquæ, 1000 grams.—M.
2. R Sodæ boratis, 15 grams.  
Olei eucalypti, 2 grams.  
Magnesiæ carbonatis, 4 grams.  
Aquæ, 1000 grams.—M.

Rub the oil with the magnesia, add the water gradually, having dissolved the borax in it, then filter and mark the filtrate mouth wash.

The patient should hold the wash in the mouth for at least a minute, forcing it constantly in and out through the spaces between



the teeth, to bring the fluid in contact with the points of decay, changing their reaction from acid to alkaline, and washing out the *débris* collected about the necks of the teeth, and in the spaces between them.—*Wm. Herbert Rollins, in Boston Medical and Surgical Journal.*

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## HINTS AND QUERIES.

“He that questioneth much shall learn much.”—BACON.

CORRESPONDENTS desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

THE following questions are submitted for answer: Is *dentos* positive or negative to all of the metals? Can there be a positive electric current without, or in the absence of a negative current? Is the current produced at the expense of decomposition of the positive or negative element, or both? Can the menstruum used to excite the battery be so changed as to reverse the currents, or, in other words, convert a positive into a negative current; and what alteration is necessary in the menstruum or exciting liquid to produce this change?—F. T. GRIMES, M.D., D.D.S.

WILL some one please inform me what is the etiology of cyanosed gums, when not traumatic or due to metal poisoning?—A. E. M.

IN the June number of the DENTAL COSMOS, Dr. Shoemaker gives a very plausible theory on the separation of the teeth for filling, especially of the bicuspid and molars. We would gladly avoid separation if we knew how. The doctor tells us to do it by contour fillings. Will he please inform us how to put contour fillings in approximal cavities of molars and bicuspid without separating?—T. J.

ABOUT BUNSEN BURNERS.—Having experimented somewhat largely with Bunsen burners, my experience with them suggests the following reply to the query of S. E. T., in the DENTAL COSMOS for May:

To produce a smokeless flame, the gas in its passage through the tube must mix with sufficient air to insure perfect combustion. The air is drawn into the tube in the same way, or on the same principle that water is forced into a steam-boiler, by a small jet of steam in the various forms of injectors, or that saliva is drawn from the mouth by a small jet of water in Fisk's saliva-ejector.

It is important, to insure successful working, that the burners should be proportioned to the work they are intended to do. If designed for annealing foil, and used for vulcanizing, they will smoke, because the tube is too small to allow sufficient air to mix with the gas. If designed for vulcanizing, and used for annealing foil, they will light underneath, because, when the gas is turned off so as to give a flame suitable for that purpose, its pressure is so reduced that it will not produce sufficient air current to carry it to the top of the tube.

The diameter of the tube and the gas jet should be proportioned to each other, so that, at the average pressure, just enough air enters to produce a blue flame. It is important that the gas enter the tube under pressure, so as to produce a current in the tube, as it is this current that draws the air in and supplies the extra oxygen that consumes the carbon. The variation in gas-pressure constantly occurring—especially early in the evening, when the lights are being lit, and later, when they are turned off—explains why a burner sometimes smokes and sometimes does not. The range of most burners is not very great, either too

much or too little gas causing them to smoke. On this account, where a great variation of heat is required, I have found several independent burners of small size more satisfactory than one large one. It is also important that they be kept clean, so that nothing obstructs the flow of gas or its free passage along the tube.

To prevent lighting underneath, or at the opening intended for the admission of air, a gentleman connected with the Stevens Institute of New Jersey—whose name I cannot now recall—suggested drawing in or reducing the diameter of the top of the tube (the end where the gas is lighted) about one-third or one-half, making it cone-shaped. This I find a decided improvement. It does not entirely obviate the difficulty, but it does make it far less likely to occur. I would also suggest that if the tube is long and of small diameter there is less annoyance from this. To produce a smokeless flame, the gas-jet should be as small as possible, to give enough heat for the purpose required; the tube long enough to give the gas time to mingle with the air, and yet not so long that the friction of the gas should so retard its passage as to prevent the air being drawn in; and the openings for the admission of air should at least be as large in the aggregate as the diameter of the tube.

As a suggestion, one I use for annealing foil is made of one-fourth-inch tube, reduced to one-eighth-inch diameter at the top, and six inches long. The gas enters through a hole made by the very smallest cone bur used in the dental engine, just penetrating the metal of the gas supply-tube, perhaps about a line in diameter. This gives a perfectly blue flame half an inch long. For the vulcanizer, I would suggest a one-half-inch tube reduced to one-fourth-inch at the top; from four to six inches long, and a gas-jet about one-twentieth of an inch in diameter.—W. H. T.

In answer to Dwight M. Clapp's query in the DENTAL COSMOS for May, I would suggest that the advantages claimed for non-cohesive methods of working gold,—that is, methods of using gold that do not *depend* upon the cohesive properties of the gold,—are, that the lateral pressure insures its accurate contact with the walls of the cavity; that, as there is always a body of gold between the instrument and the wall of the cavity, there is less danger of the dentine or enamel being crushed or injured by contact of the steel instrument; that, as the cylinders, blocks, or tapes reach from the bottom of the cavity and form the surface of the filling, there is less danger of particles of gold scaling off at the edges and leaving that vital point imperfect; that the accidental pressure of moisture or other causes that prevent the cohesion of gold are far less serious; and that, by these methods, the insertion of gold fillings is rendered far less tedious and trying to both patient and operator. It is a mistake to associate—as is so constantly done—non-cohesive gold with non-cohesive methods. An experience of many years in the use of semi-cohesive, or cohesive gold unannealed,—that is, not re-annealed as it is put into the cavity, but annealed after heating,—in cylinders or blocks, convinces me that the pressure used by these methods usually welds the gold into a solid mass, more perfectly so than the gold and the method of using it he speaks of.

Sufficient cohesiveness to perfectly weld, with light pressure, and the softness and pliability of non-cohesive gold, are never found associated together. This is now recognized by the best workers of cohesive gold, who almost universally use their gold in narrow tapes, so as to avoid the "balling up" that proved so annoying when it was used in pellets. Experts with the best instrument ever devised for impacting cohesive gold—the electro-magnetic mallet—call for the

most cohesive gold they can get, use it in its most cohesive state, and use it in a manner by which its deficient pliability inconveniences them the least.—TOBY.

**SWEATING HANDS.**—Some one has asked, in an English medical journal, the same question asked by W. R. P. in the DENTAL COSMOS of December last. The following replies were elicited in the English journal, and may perhaps interest the American querist.—A. P. R.:

**SIR:**—Having seen no reply to the letter from "Medicus," I beg to inform him that this subject was discussed, at some length, a few months ago in the *Journal*. Many suggestions and forms of treatment were then given, but all equally futile. It is very doubtful if there be any remedy at all for this unfortunate condition of the hands; but I should be glad if you would allow the question again to be discussed. Only those who suffer from "sweating hands" know what a misfortune it is. Thousands would be grateful for a remedy. It does not appear to be understood that the affection is a purely local condition, and not a matter to be treated constitutionally. It is congenital and inherited. I know of so many instances confirming this, of so many families in which this "complaint runs," that I have no hesitation in affirming so much.

Your recent correspondents were nearly all led astray with the notion that internal medicines could remedy the condition. The people who suffer from "moist hands" (and no class of society is exempt) enjoy, and have enjoyed (as a rule), the same good health as their fellows. They are often remarkably and exceptionally healthy, their one and only complaint being this extraordinary perspiration of the hands, which clings to them through life like a leprosy.

I lately consulted Mr. Erasmus Wilson in a typical case of this kind, and he shook his head: "There was no remedy." But I still hold that there ought to be a satisfactory method of treatment, if not an absolute cure—something that shall stop this unnatural and abnormal flow from the pores of the hands. For the health of the body cannot, at least, depend upon "sweaty hands."—I am, sir, yours faithfully,  
AN ASSOCIATE.

**SIR:**—In reply to your correspondents who have sought a remedy for "hyperidrosis," I venture to make the following suggestion: Dr. Ringer, in his excellent work on "Therapeutics," strongly recommends the application of belladonna. I believe he generally uses the "linimentum belladonnæ" for the purpose. Steeping the hands and feet in water in which "club-moss" has been soaked is a popular remedy. Of the efficacy of such treatment, however, I know nothing. Of course, the general health of the patient should be carefully attended to.

Yours faithfully,

L. R. C. P. LOND.

**OBTUNDING SENSITIVE DENTINE.**—Heat is a powerful adjunct to any agent used for this purpose. Apply the remedy to a dry cavity; take an ordinary chip-blower syringe; express the air; hold the nozzle in the flame of an alcohol lamp and allow the syringe-bulb to expand. The flame will be drawn in and the bulb filled with hot air. Inject this into the cavity as hot as the tooth will bear, and repeat several times. Heated air applied in this way is the main dependence of the advocates of Nāboli. I get as good results with creasote, aided by hot air, as are *privately* claimed by any one with anything.—T. F.

An ingenious dentist of this city, Springfield, Mass., has recently made a new gold combination filling, which is superior in many respects to the ordinary plastic preparations, and has some claims which should entitle it to consideration. It is composed of one grain of zinc phosphate in powder, to four grains of gold, with sufficient of the oxyphosphate liquid to incorporate into a paste. Watt's sponge or Morgan's plastic gold is used for this purpose. The inventor informed me that he had been lately experimenting with the filings of pure gold plate (24k), which hardens quicker than the other forms of gold. This filling-material, when hard, has all the appearance of a solid gold filling. The writer has seen a specimen of this filling, and it would be difficult to distinguish it from a gold-foil filling.—D. GEORGE, D.D.S.



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No. 9

ORIGINAL COMMUNICATIONS.

DENTAL SURGERY—NOT DENTAL MECHANICS.

BY T. D. SHUMWAY, PLYMOUTH, MASS.

(Read before the New York Odontological Society, May 17, 1881.)

It may seem somewhat strange that I should appear before this body and presume that there can be at this time a necessity for any special plea for dental surgery. If what I may offer savors of dogmatism, I am confident that, in this presence, whatever opinions I may advance, unsupported by reason, will meet with little favor, and fall harmless, except upon my own head.

To deny the correctness of old and tried systems, or to advance new theories, brings a certain responsibility. It is a trite saying that "it is easier to pull down than to build anew;" but to eradicate old notions and drive out prejudices is really no easy task. The ground for objection must be carefully examined, for the mind is always jealous and on the alert, ready to set up a defense, whenever methods long established are called in question. Opposition only makes us more tenacious of our opinions. If the mind is fallow, and ready to receive new truth, then the responsibility is increased, for after all should the seeming truth prove to be only error, it will be the old story repeated, of the blind trying to lead the blind. I do not come here puffed up with my own conceit, expecting a simple *ipse dixit* is all that is needed to revolutionize systems, direct thought into new channels, or bring about a sudden change in methods of practice. My experience has taught me better. Ten years ago I met one of the most distinguished members of this society, whose reputation is not confined to one continent, and in a stammering, faltering way, told him what I was attempting to do, doubtful lest the very mention of it might bring down upon me the severest condemnation. His reply did credit both to his head and heart: "I don't say it can't be done, because I have said that so many times, and then had to take it back, but I will say I should like to see you

do it." Another member of our profession, alike distinguished, whose untimely death cut short a life of much promise of future usefulness, remarked on this same occasion, "Here is a little fellow from the country who presumes to come to Boston to teach us how to fill teeth."

Whatever may have been my earlier expectations as an enthusiast, mature reflection, combined with many obstacles to be met and overcome, has sobered my judgment. At the same time I approach the subject with none of that doubt and hesitancy which characterized my first endeavors, but with the confidence born of assurance, the result of repeated experiments added to daily practical tests.

An intelligent neighbor of mine quite frequently makes use of this expression: "Much of the so-called modern scientific knowledge is simply nescience." Those who have attempted to follow the current of thought in our literature, or who have been guided in their operations by its teachings, must be impressed with the truthfulness of this assertion, so far as it relates to dentistry as a scientific profession. Now, there are certain reasons for this statement. It is patent to all that there is a point in human knowledge beyond which it is impossible to go, just as in physical development there is a certain stage, which, when reached, is followed by physical degeneracy. There is a certain breed of sheep, in which one of its most valued characteristics is the small size of its head. Now, it is plain that there is a point in breeding this sheep, beyond which it would not be possible to go and maintain the standard of excellence. So in the pursuit of scientific knowledge there is danger of so narrowing the circle of observation, by concentrating all the energies upon one object to attain a single end, as to destroy its value as a scientific demonstration.

This condition may be reached so unconsciously that we are not made aware of our extreme folly.

The ultimate of all scientific investigation is simplicity. This is the standard by which all knowledge is measured. To state a truth in a way to make it plain to an ordinary understanding must be the highest scientific attainment. To embody this truth in a form to simplify methods is the practical test of its value.

Now, I submit that much of that which has passed current as scientific truth in the dental profession falls short of the claim set up for it, when tested by this standard. It is true, we have no end of technical terms and long words of uncertain meaning, but the only purpose these seem to serve is either to awe the ignorant reader or conceal the paucity of thought in the writer. Is not the profession each day burdened with increasing complications? Are we not constantly tending further and further from that standard of simplicity

which is the measure of knowledge? Is not the result of this seen in the multiplicity of machines to carry into effect the various formulas this so-called scientific dentistry reveals? The esthetic element has been emasculated, and as a natural sequence there is let loose a horde of titled and untitled machinists, instead of dentists. The want of system in the methods of operating is evidence in proof of the statement that much of so-called dental science is simply nescience. It is curious to look over the literature of the last two decades, and observe how completely at sea the profession have been in regard to the most frequent, and yet the most important operation the dentist is called upon to perform. It makes one shudder to think of the wrecks that have been made in attempts to save the teeth, while the champions of the various modes of operating have been almost without number.

We have had the advocates of the hand-mallet,—some for iron heads, others for brass, lead or zinc, and still others for wood or rubber, with various weights, ranging from two ounces to three pounds. Then the advocates of "live" blows and "dead" blows. Some for contour and others for flat fillings. Then the champions of the automatic mallet, then the pneumatic, the electric, and again the engine mallet, with extension fillings to prevent contact. Some say, use number two foil, others number four hundred and eighty. Each of these only added to the confusion and complication, making the operation of filling more difficult, and, as a consequence, more uncertain. This is dental mechanics, not dental surgery. Some who conceived that they possessed a greater degree of mechanical skill than their less fortunate co-workers, whenever any of these differing modes were called in question, declared that this was the result of failure by reason of defective manipulation, and coolly advised not to attempt to fill teeth with gold, as nature vouchsafed this wonderful gift to but few, and they were not of the few. Failure on failure produced at last the revolt known as the "New Departure." This, perhaps, in some of its teachings, is as faulty as any system that preceded it, but it has the merit of an attempt to simplify operations, and construct a system by scientific demonstration, and is entitled to respectful consideration. Its coming at a time when it was generally believed that dental science was making its most rapid advancement was significant. It was in fact a revolt against narrowing the boundaries of usefulness by allowing mechanics to usurp the place that belonged to surgery. The want of system, and consequently a confession of want of scientific knowledge, is conceded at present in most of our dental schools. The student is now told that these institutions are eclectic; that they teach all methods, and if he pays his money he can take his choice.



Eclecticism, or the ability to choose from differing systems, is a very good thing when there are well-defined principles or methods from which to make the selection. But when this is resorted to as a make-shift, it may be productive of the greatest amount of harm.

Eclecticism, in remedial or preservative agents in dentistry, should be based upon a knowledge of pathological conditions on which all are agreed, and which admits of no latitude. But eclecticism in methods in which these conditions are disregarded must result in failure.

Diseased conditions are not changed to healthy ones by the application of mechanical force. Such a result comes from that recuperative power which inheres in the constitution. To arrest the progress of decay the methods employed must be allied to the general principle which is found to govern the life and growth of all animated things.

The choice of methods or materials is subject to the law of correspondence. If you had a tree in your garden from which the bark had been peeled, you would not take a hammer and pound the fiber of the wood to restore it. We all very well know the law of mechanics would be inoperative, except to extend the injury. Now, there is no difference between the tree from which the bark has been stripped, and a tooth denuded of its protective covering. It is true the tree has the power within itself to restore the lost part, while the tooth has not, yet the process of nature to protect and preserve is the same in each. The serum in the dentine corresponds to the sap in the tree. The ponds, so characteristically mentioned by Dr. Tucker, must exist, whether science reveals them or not. Analogy teaches as well as the microscope. The work of calcification goes on in the tooth silently and unperceived. These little ponds are being converted into hard tissue just as the sap in the tree is being changed into woody fiber. If decay begins, the process is suspended. To arrest decay and erect a barrier to prevent its return is the work of the dentist. To be successful with this work regard must be had to correspondence. While the agent employed may not be remedial, it must not be obstructive. This calls for surgery, not mechanics. It partakes as little of mechanics as does an operation on the eye or ear. By correspondence is meant that the filling or stopping shall be of such a character as not to interfere with the process of restoration going on in the tooth itself. To supply this requires a knowledge of physiological and pathological conditions. Eclecticism will not answer, except to determine the choice of material and method of working to meet these conditions.

The filling-material may, in itself, fulfill all the requirements, but the method of working may make it a destructive agent to thwart

the very purpose it is designed to accomplish. If tin could be used in the different states in which it is possible to use gold, it would develop just those dangerous properties every intelligent dentist has observed in the nobler metal.

Unannealed gold is very like tin, and a filling of one is just as compatible with tooth-structure as the other. The reason for this is, that the method of working is the same in each, and the filling, when completed, has the same structural arrangement. These fillings are made up of laminae or scales, and by the law of correspondence meet the conditions required by the surrounding tooth-bone. A bond of sympathy is established, and the work of restoration goes on within.

The same physical structure is observed in white wax. I have known teeth to be preserved for a long time by the use of white wax alone, put in without regard to decay, or even with particles of food remaining in the cavity. It is generally admitted that gutta-percha has certain properties required in the most perfect stopping. The gutta-percha is formed according to this same law, and simply conforms to the conditions required by the surrounding walls.

It is true, the opinion generally obtains that operations upon the teeth are only mechanical. How much of this is due to the teachings of those who have been foremost in giving direction to dental thought and education, it is not my purpose to discuss. It is sufficient that all through our literature are to be found expressions like this: "The mere act of filling a tooth is a mechanical one." If we would elevate the standard of dentistry it is time this teaching should cease. The act of filling a tooth, if properly understood, is a surgical one. In the whole range of dental operations I know of none in which mechanics should play so small a part as in that of filling teeth, if preservation is the end sought.

It is my conviction that the degree of failure has been in the proportion that the machine has taken the place of surgery. The process of decay is a chemical one—the result of violation of natural law. The means of arresting it and preserving the teeth must be in correspondence with this same law. Mechanics is the application of forces over which man has control, to arrest nature and subject her to his will. The operation of these forces is artificial, not natural. Nature refuses to be bound by mechanical rules. She is not governed by mathematical demonstration. To reduce dental operations to mechanical formulas is to take dentistry out of the domain of surgery, and make it simply a trade. It then ceases to grow; the incentive for further investigation and discovery is gone. If the act of filling a tooth is mechanical merely, then dental science, so far as

filling teeth with a view to their preservation is concerned, is at a stand-still.

The indifference, it might almost be said contempt, in which the operation of filling teeth is held by those who may, with truth, be called the best class of practitioners, shows the extent to which mechanics has crowded out surgery. This indifference may be real or affected. That it exists there is abundant evidence. Ten years ago clinics were the great attractions at dental conventions. Now, as a professor of operative dentistry in one of our reputable schools remarked: "They have ceased to interest; the profession have tired of them; the filling of a tooth is only mechanical, and from it there is nothing to be learned." This operation, then, on which the future of dentistry must depend, if it would maintain the dignity of a special calling, has ceased to interest the dental profession. This is the legitimate result of dental mechanics.

It is claimed that the application of mechanics in dentistry facilitates the operation; that it makes a great saving in time and labor. Can this claim be sustained? Is the average duration of gold fillings sufficient to justify the assertion? Does not the frequent demand for a repetition of an operation by reason of subsequent decay, through violation of natural law, make a great waste in time and labor? Would not a delicate manual manipulation, remedial in its tendency, save much by its superior lasting qualities?

Again, the conservation of physical and nervous energy is of vastly more importance than the mere saving of time. Nature is never prodigal of her forces. In the operation of natural law there is no waste.

Not so with mechanics. The application of mechanical principles always meets with resistance. In the operation of filling teeth this resistance is met by an expenditure of physical and nervous force. When the operation is complicated by the use of machinery, the resistance is correspondingly increased.

Life is possible without teeth. Where the saving of them is attended with too great a waste of nervous power, with the uncertainty attached as to the final result, it is setting too high a cost for their preservation.

In closing this paper allow me to recapitulate, that the central points it has been my endeavor to elaborate may be clearly understood. In the first place, the measure of all knowledge is simplicity. To be scientific is to be simple, easy, and plain. Dentistry being burdened with increasing complications does not meet the requirements when measured by this standard. It is a retrograde movement; not a scientific advance. Dental operations should be remedial, not merely a display of mechanical skill. The arrest of decay



and preservation of the teeth depends upon the same law that governs all the other parts of the human organism as a condition of health.

The law of mechanics will not apply. To disregard plain, simple, natural law, is to invite failure. To substitute mechanics for surgery lowers the standard of dentistry, narrows the boundary of observation, and limits the field of professional usefulness. There is a tendency, instead of developing into a scientific profession, to degenerate into a trade.

The law of correspondence must govern in the choice of filling-material. Gold is a safe filling-material when used in obedience to this law.

Finally, the conservation of physical and nervous force is a more important consideration than the saving of time.

## ESTHETICS IN ARTIFICIAL DENTURES OF CELLULOID AND PLAIN TEETH.

BY STEWART J. SPENCE, NORTH SAN JUAN, CAL.

THE advent of celluloid, having made the use of plain teeth esthetically admissible, has opened a new field of art to the dentist. Celluloid makes possible the most beautiful and exact copying of nature, and it also makes possible the most frightful incongruities and enormities which we see daily increasing around us.

There are two important advantages secured to us by celluloid. First, it is now possible to set teeth directly under the ridge, and thus to prevent the tilting of the plate in biting. Second, it is now possible to do away with artificial gum above the upper front teeth, and to set plain teeth on the natural gum. Important as these two points are, the worker in celluloid will often find them clashing with other principles, and the question of which to sacrifice, utility or esthetics, will constantly force itself upon his judgment, and the problem will be difficult to solve. Under such circumstances, it is pre-eminently necessary that the artist in celluloid should be a close student of nature.

Without being able to give rules and principles to suit all cases, I will venture on a few which may aid beginners in the use of these materials.

In nature, when the mouth is at rest and the lips open, about two-thirds of the length of the upper incisors and one-third of the lower are visible. The upper lip being then raised a little higher, reveals the roundly-arched festoons of the gums, and the inter-dental spaces filled up level, or almost so, with the labial surface of the teeth. Raised yet higher, the lip reveals the gum rising perpendicularly or

nearly so. The festoon of the gum of the laterals is on a lower level than the central incisors and cuspids, and their cutting-edges are often higher than those of the centrals and the cusps of the canines, which latter are on about the same level with each other.

In art, with plain teeth and celluloid, the opposite of all this is often seen—unevenly-arched festoons; inter-dental spaces hollowed out; laterals as high up as centrals and canines; the cusps of canines hanging far too low; the gum bulging out above the teeth; and very often that worst blunder of all is apparent, the superabundant exposure of both tooth and gum, which may be caused by setting the tooth directly under the ridge, for the purpose of obtaining more strength of bite. And here comes a problem. It is certainly a gain to utility to place the teeth under the ridge, but if the upper lip is short and allows of much exposure of the teeth; if the upper lip needs distention; if the artificial teeth thus placed occlude with the lower on their edges, instead of over-lapping; in short, if beauty is sacrificed to any considerable extent—we think it were better to bring the teeth out from under the ridge and place them where natural appearances indicate.

The same problem arises concerning the question of whether or not to use gum with the front teeth. In nature, at least in *beautiful* nature, the upper lip extends beyond the lower. We all know how much a sunken upper lip disfigures a countenance, and it is especially liable to occur where much alveolar absorption has taken place. In such cases, the use of artificial gum above the front teeth is indicated. But where the gum is prominent, exposed, and rises perpendicularly, plain teeth set on and sunk slightly in the natural gum, have a beautiful appearance.

The problems as to whether or not to set the upper front teeth under the ridge, and whether or not to use gum above these teeth, must be worked out with reference to the shape, etc., of the lips, upper arch, and lower teeth, if retained.

*Arrangement of the Incisors and Canines.*—There is probably no greater “esthetic blunder” than the too common one of antagonizing teeth so that the incisors occlude at their cutting-edges, instead of the upper over-reaching and over-lapping the lower. This often occurs where the upper substitutes are placed directly under the ridge. It is difficult to see what is gained by this practice, or what the dentist thinks he gains by it, unless it be an improvement of the esthetics of nature, by giving greater regularity; or possibly that he thinks the teeth thus better adapted for mastication or incision. In either case he is wrong, for in incision the lower jaw naturally reaches forward until its incisors are under the upper incisors, in nature’s order; and in mastication, if the front incisors are required

to perform it, they can do so better on a shoulder ground under the pin-heads, where the force of mastication falls on the part of the tooth most under the ridge; and if mastication is performed by the molars, the upper incisors are more out of the way and less liable to cause displacement of the plate when over-reaching the lower incisors than when clashing with them. But esthetics suffers most by this arrangement, chiefly in two ways. First, the attempt to follow the arch of the lower front teeth when thus antagonized is liable to give a square, heavy, and almost savage look to the upper incisors and canines, especially in those cases where the lower incisors are inclined to be square, as we sometimes see them. This may be remedied by giving more prominence to the incisors and thus making the canines appear to fall back. A sharp curve at the incisors gives a pleasant appearance to many faces, particularly in narrow ones. Second, the bicuspid and molars are exposed (especially in looking up to a person), thus giving an effect clumsy and unnatural. This disagreeable effect is heightened in cases where the bicuspid and molars are actually on a lower level than the incisors, as is often the case where they occlude with lower bicuspid and molars which are (if natural teeth) usually on a lower level than the incisors of the same jaw, while the upper incisors are not allowed to over-lap the lower.

*Arrangement of the bicuspid and molars.*—A too common divergence from the regard for appearances manifested in the works of nature is seen in the misplacement of the molars and pre-molars, especially the latter, by extending them outwardly too much, instead of letting them hug the gum, thus giving the appearance of a mouthful of teeth, and an undue fullness to the lips at the corners of the mouth, —the whole appearing very clumsy, and especially so in a narrow, angular countenance, with which it is often seen; probably because the dentist desired to give fullness to sunken cheeks.

*Giving a crowded appearance.*—This cannot be done so as to look truly natural without grinding the approximal edges of the teeth sold at the depots, generally at their palato-approximal angles. This done, the natural appearance of crowded and over-lapping incisors can be given.

*Giving appearance of old age.*—This may be done by leaving the necks of the teeth exposed; cutting out the celluloid from the interdental spaces and leaving it thick at the edges forming the festoons, and by grinding down the teeth about one-sixteenth of an inch, or to their widest breadth, as if worn. In pursuance of this mode, the cusps should be ground from the canines, but they add so much to expression that we prefer to spare them, as also those of the bicuspid, which are so often most wantonly ground away.



## THE COMPATIBILITY OF RUBBER AND CELLULOID WITH THE TISSUES OF THE MOUTH.

BY E. S. NILES, BOSTON, MASS.

(Read before the Connecticut Valley Dental Society, June 16, 1881.)

IN the DENTAL COSMOS for May, 1881, there was an inquiry with reference to a remedy for "burning" of the mucous tissue in the mouth and throat of a patient wearing a base-plate of vulcanite or celluloid. I should advise the substitution of a metal plate, for the following reasons: Rubber and celluloid are poor conductors of thermal changes. It is evident, therefore, that the surface of the mouth covered by either of them is kept at a higher temperature than when in a normally exposed condition. The temperature of the body is maintained at from 98° to 100° F., mainly by the dilatation or contraction of the blood-vessels on the surface, and the cooling of greater or less quantities of blood by contact with the air. The interior temperature of the body is raised when these vessels contract, by the heat produced within being retained. A good illustration of this retention of heat is the effect produced on a warm day by wearing a rubber overcoat as a protection from rain. In this case, however, there is more or less looseness of the garment, which permits some circulation of air, and an imperfect radiation of heat may occur.

In the case of a rubber or celluloid base-plate, the admission of air for ventilation would prove extremely disastrous to the retention of the appliance. But when the air is entirely excluded from beneath a plate there is a pressure on its outer surface of fifteen pounds to the square inch. Absolute exclusion of air is, however, seldom accomplished. That there is an outward pressure in the body antagonizing the external pressure is shown by the fact that, when the external pressure is removed from a human body, the blood comes to the surface and is forced from the ears, nose, and mouth. If we place the lips on a tender, unexposed surface, and draw so as to exhaust the air, the blood flows immediately to that spot—a fact we should bear in mind in retaining plates by atmospheric pressure; it is, in my opinion, an objection to all so-called suction-plates. The continual sucking required in some cases to hold the plate to the roof of the mouth, must cause congestion, but how far this may have been the cause of inflammation in the case in question I am not able to say. If the trouble should be relieved by substituting a plate of good conducting property, held in place on the same principle, that would seem to set this suggestion aside, provided the metal plate excluded just as much air as the rubber or celluloid base did.

We have all heard or read of the injurious effects resulting from wearing rubber and celluloid plates. Salivation, ulceration, and necrosis, it is charged, have been produced by wearing dentures set upon these bases. Dentists do not, as a rule, stop to think that such conditions may be attributable to the continued stimulation or irritation produced by the presence of a non-conducting plate. Salivation may be caused by holding any substance in the mouth—simply from stimulation of the salivary glands by reflex action. The palates of some patients are highly sensitive, hence they experience more or less trouble from an excessive flow of saliva while wearing plates, which, in the same manner, cause over-stimulation of the glands. Ulcerated or necrosed conditions may result from long irritation and congestion of the tissues, and it is probable that in some of the cases on record such conditions may have been produced by a long-continued congestion.

The fact that sulphide of mercury is used as a coloring matter in the preparation of both rubber and celluloid, has given rise to the suspicion of mercurial poisoning. I do not claim that such impressions are wholly incorrect, but I shall try to show how this may or may not be the case. Vermilion is a sulphide of mercury (or mercuric sulphide  $\text{HgS}$ ), occurring in nature as cinnabar ore, and this is often powdered and sold as vermilion, for painting, etc. It is evident that vermilion from this source contains, among other impurities, free mercury. It is, therefore, quite possible that some manufacturers of celluloid and rubber may have used impure coloring matter; if so, the acids developed beneath the plate would dissolve any free mercury, which could then be absorbed into the mucous tissue or be carried into the system through the absorbents of the stomach.

There are two other sources from which purer qualities of vermilion are derived: One by roasting sulphur and mercurous sulphide ( $\text{Hg}_2\text{S}$ ), and another by passing sulphureted hydrogen through corrosive sublimate and heating the precipitate. The last named is the preparation made by what is called the "wet process," and, according to various authors, is the source of pure vermilion. When thus prepared it cannot contain any compound soluble in the fluids of the mouth. When we consider that the sulphide of mercury is nearly an insoluble compound (only dissolvable by strong nitro-muriatic acid), and that it also requires a very high temperature to decompose it, it is not easy to see how it can become poisonous through any of the influences in the mouth, even if we ignore the fact of the mechanical retention of the vermilion by the rubber or celluloid.

By recent observation I have proved to my own satisfaction that

no change takes place in the stability of vermilion during vulcanizing. The deepening of color is due to the escape of sulphur, and the formation of black mercurous sulphide ( $\text{Hg}_2\text{S}$ ); the higher the temperature and the longer the time of vulcanizing, the more sulphur is driven off, and the darker the rubber resulting. Analysis of the residue in the vulcanizer after taking out the case proved the general supposition true in regard to the black deposit, or solution, with the exception that there was about five per cent. of black mercurous sulphide; the bulk was sulphide of copper formed by the action of sulphuretted hydrogen on the copper of the vulcanizer. It is therefore evident that if pure vermilion is employed in the preparation of rubber or celluloid, no injurious effects can come from the mercury.

The fact that rubber and celluloid are not good conductors of heat and cold is one generally understood in the profession, and is, I believe, of such importance as to require our serious attention. That a tissue, long congested with blood, becomes hypertrophied, is no new idea, and is verified more or less under every rubber or celluloid plate inserted.

Do not get the impression that I am opposed to the use of rubber or celluloid altogether, for that is not the case. I have given this matter careful consideration for my own benefit in practice, and you are welcome to my conclusions. There are two kinds of mouths met with in supplying artificial dentures, generally classed as the soft and hard—varying from very hard to soft. Now, it is evident that those mouths that are soft have a greater vascularity, and more soft connective tissue than the hard, and they are, therefore, more susceptible to inflammation. The hard mouth is not so easily inflamed, being more largely made up of cartilaginous and osseous tissue. The last named would doubtless tolerate conditions favoring inflammation, and in such mouths a rubber or celluloid plate might be worn with comfort, but in cases of a “flabby” mouth, a metal plate, of good conducting power, should be inserted, in order to secure the best results by facilitating the reduction of heat. It cannot be expected that, if injurious effects have been experienced for a long time, from patients wearing an improper base, the substitution of a metal base will give relief at once. The tissue, by long congestion, has become hypertrophied or thickened, the vessels chronically enlarged, and the nervous mechanism more or less paralyzed; so that, if the parts are restored, it will take time in proportion to the extent of the trouble, the health of the patient, etc.; though assistance may be rendered by the daily use of astringent washes. In accordance with the recommendation of Dr. Brackett, of Newport, R. I., I have used Pond’s extract of hazel,



with satisfactory results, in such cases. It seems to me that the same thought should be exercised in the selection of a base-plate for a given case as in selecting the filling-material best adapted to any special cavity. If, under certain circumstances, it is desirable that rubber or celluloid should be used, and the mouth is of the kind that best favors it, let the plate be made as thin as possible, and instruct the patient to keep the mouth cool by occasional rinsing of both mouth and denture with cold water, and under no condition to wear the plate at night to "favor the fit." In my opinion, it is bad practice to advise patients to wear any plate at night. The mouth needs rest as much as our feet and bodies do from the clothes we wear by day.

It is true that the inflammation or swelling of the tissue renders the parts softer, and that a plate has a more yielding resting-place; but if we wish to keep the mouth in a healthy condition, it must be freed, as much as possible, from irritating influences.

Another thought in regard to the incompatibility of non-conducting plates. A mouth heated by the action of these materials leads the person to seek some cooling influence, and either consciously or unconsciously, such persons may inhale and exhale air through the mouth, producing injurious effects upon the lungs.

These various chemical, physiological, and pathological questions suggest to us the value that a thorough medical education would be to us in the practice of our specialty.

### "WHAT IS THE MATTER?"

BY GARRETT NEWKIRK, M.D., WENONA, ILL.

A PROFESSOR in one of our leading medical colleges has a unique way of answering a common question,—a question that, whenever asked, betrays a condition of narrow-mindedness on the part of the questioner. What is good for diarrhœa? What is good for typhoid fever? "That, gentlemen," says the learned professor, "depends altogether upon *what is the matter*." He takes this method of impressing upon the minds of his class a simple and very practical truth, viz.: that it is not sufficient merely to give a thing a name, and then prescribe by rote. Naming is one thing; understanding is another. The habit of prescribing by name is that of the mere routinist or the quack. The man who does it is close brother to the Chinese doctor, who, in the crudity of his understanding, supposes each ailment to result from the presence of a particular kind of devil, and which only a particular drug will be efficacious to dislodge. If he is in doubt as to the identity of his devilship, he

mixes all his specifics together and gives them at a dose, sure in his mind that some one of the lot will hit the imp and cripple him.

The case of the Chinese doctor is a hopeless one, based on irremediable ignorance and superstition, but it is scarcely less hopeful than that of the professional routinist, who never thinks of going beneath the visible surface to inquire, "*What is the matter?*" Routinism, or mere rut-ism, is the refuge of ignorance, or the excuse of laziness, —a way to be carefully avoided. It is one thing to do something because somebody expects us to, or because *something* has to be done, and it is another thing to know and to do a thing because it should be done. The one is the way of the charlatan, the other that of the scientist.

In medical practice, the case that presents to the physician stands by itself, separate and distinct in some respects from each and every other case, and demands his special consideration. A name found may be a help without being an invariable conclusion. "What is good for diarrhœa?" Shall we give opium? Yes. No! Astringents? Yes. No! Stimulants, castor oil? Yes and No! It all depends on what is the matter. The diarrhœa is only a sign of some condition which may call for one or another kind of medication, or likely none at all. Where the conditions are fully understood, then and then only can the doctor act intelligently with advice or remedy. Science is knowledge. The physician who seeks by all possible means to know, is a true scientist; if he merely blunders or guesses, he is not.

So in dentistry, questions are being asked continually which might well be answered by the Allenian aphorism, "That depends on what is the matter." Shall we extract sixth-year molars? Shall we save the wisdom teeth? Shall we separate, and by what method? Shall we cap exposed pulps? Shall we make contour fillings? Which is the best filling-material? Which is the best, cohesive or non-cohesive gold? Mallet or hand-pressure? To such questions simple answers are desired, whereas they involve problems that are not simple, but complex. Everything depends on "what is the matter." Questions are often asked to which we feel bound to give kind and respectful answers, and yet they are painfully suggestive of the crudity of ideas in the mind of the questioner. It sometimes happens, furthermore, that the answers given in response to such questions are equally suggestive of a limited range of view, or a hopeless condition of hobbyism.

Our duties cannot be laid out for us and defined by rule. Nobody can tell us what to do. Each case that presents itself in the dental chair is like the one in the physician's office, in that it has peculiarities of its own. The dentist, like the physician, must discover

special facts as well as general resemblances and names, and the sum of all must be his conclusion. He ought to have a sufficient mental and educational basis,—the broader and deeper, the better. Then he must use his senses for himself, including that greatest sense of all, common-sense.

The first thing asked by the medical man when called to a new case is, What is its history? What have been the causes leading up to the condition of things now existing? Have they been remote or immediate? How far external, and how far constitutionally inherent? To what extent general or local? What specific element? How have these so blended as to be resultant in that which I see before me? Thus he questions facts, by the eye, the ear, the smell, and the touch; questions knowledge, experience, and the analytical powers of his own mind. He seeks to know everything that has or may have a bearing upon the case. He tries to learn just "what is the matter." Whenever he is sure as to the correctness of his diagnosis, he feels that his feet stand on solid ground. The battle is already half won.

So it should be with the dentist. While the field of his operations is smaller than that of the physician, it is a part of the same farm. He is having to do with the same humanity and the same general interests of health and well-being. The same underlying general principles should guide his steps and govern his actions.

When a surgeon has performed an operation he does not say, as a rule, "I have operated on a leg or a perineum for Mr. So and So." He would say, "I have operated on Mr. So and So for this or that." In his mind the person operated on is of first importance, the parts secondary. Too often the dentist considers himself as merely operating on the teeth. The *person* is in the chair only for the purpose of making his *teeth* accessible; his mouth, as a mouth, is nothing, except that it contains teeth. The teeth are greater than the man; he is their appendage. The teeth, and nothing but the teeth, are seen, and taken into account.

The diagnostic and therapeutic system of such a practitioner is extremely simple. The teeth that are bringing in the man have holes in them, and these holes are to be stopped, or drawn out. What shall you stop with? "Gold, of course; that is the only filling fit to go into a person's mouth." "Or, anything but gold; it is the poorest filling-material known. In proportion as teeth need saving, gold is the worst material known." Can any man with ordinary common-sense fail to see that such methods and answers are narrow and small below measure. Is not such practice on a par with that which asks, "what is good for diarrhœa?"—questions and answers without the slightest regard to the present and antecedent conditions that may exist in the particular case in hand?



The diarrhœa may be but the sign that indicates one trouble or another; it may mean the presence of either a slight irritation or a severe inflammation. It may mean a mere indigestion or the presence of some particular but harmless substance in the alimentary canal; it may mean a wholesome action in behalf of other organs, or mere nervous reflex action; it may be perfectly innocent, or it may be an exhaustive drain, bespeaking the presence of a most malignant poison.

Verily, what ought to be done will depend on "what is the matter," and this is the thing to be found out. So we must look at the person who brings in not his teeth alone, but all his other organs, and seats himself in our chair. The question is not so much "what is the matter" with his teeth, as "what is the matter" with him. What is the temperament of this child? What is its heredity? What are its predispositions? What taint exists in its blood? What have been its surroundings? What are its habits? What is its food? What may be ascribed to causes general, and what to those that are local or accidental? Are there diseased conditions manifested elsewhere, and what relations may exist between this and those? What is the character of the oral secretions? How about malarial influence? If pain is manifested out of proportion to local conditions, what part is nervous reflex action playing, and where is the source of irritation? What possibilities exist for improvement in any of the conditions we account unfavorable?

These and other questions, some easily answered, others capable of only an approximate solution, many involved in doubt and obscurity, all worthy of careful thought, all appealing to knowledge, energy, and conscience, meet us daily. They are not simple but complex. Their solution may not be by arbitrary rules. Their answers will not be found lying in the ruts of crudity, conceit or habit; they may be discovered only in the way of an industrious, patient, and intelligent search after "What is the matter."

### AFTER THIRTY-EIGHT YEARS' PRACTICE.

BY HENRY S. CHASE, M.D., D.D.S., ST. LOUIS, MO.

(Prepared by invitation of the Wisconsin State Dental Society, for their Eleventh Annual Meeting, in Milwaukee, July 19, 1881.)

AFTER thirty-eight years' practice in the profession of dentistry, I have seen many changes and some improvements. I hope and think my own experience and close observation of the results produced by my brother dentists have been of benefit to my patients. And now I will tell you what my practice is to-day.

Fill all cavities not in sight with the best amalgam to be had.

Test every new batch of alloy by glass tubes and aniline alcohol.

Varnish all cavities before filling with anything; use sandarac or shellac for gold or amalgam cavities; copal ether for all bone fillings.

Fill front teeth and cavities in sight with phosphate of zinc, and paint over the surface of the same fillings every eighteen months with the same substance.

Protect *cervical* margins of cavities filled with metallic filling with gutta-percha.

Have clear separations between filled teeth, so that cleanliness may be insured.

Non-cohesive gold foil, in cylinders, preferred to any other form.

After killing pulps, wait ten days, in order that the dead part may separate from the living part, before removing the dead part. After removal, cleanse root-canals with alcohol, and fill with thick solution of sandarac or shellac. In treating periostitis from dead pulp, drill needle-sized hole through to the pulp-chamber, exactly at the edge of the gum and beneath it.

Fistulæ to be cauterized through roots with *creasote*, until it appears on the surface of the gum.

Chronic and constitutional periostitis, improperly called "Riggs's disease," to be treated constitutionally according to indications, and *locally* by chloride of zinc, carried under the gum as far as a small and thin instrument will go without cutting the tissues. In nearly all cases *salt* is prohibited as food, and all stimulating and fiery condiments. The juice of one lemon each day is to be swallowed. Once or twice a week the roots to be scraped and the zinc applied.

Be careful of *over-treatment*.

At the age of twelve years four permanent teeth to be extracted. Sometimes the four sixth-year molars, or four bicuspidis, selecting the poorer of these teeth. This improves the condition of the oral cavity. The remaining teeth are better preserved, and the spaces sufficiently filled before twenty years of age.

Spiral springs to hold an under set of teeth in place are of great service. They are invaluable when the under jaw is very flat. They were much used thirty years ago, and should never have been so generally abandoned by the profession. (Look in the January, 1881, number of the DENTAL COSMOS, and see the article of Dr. Evans, of Washington, with illustrations.) In my own practice, I place the *pins* between the bicuspidis, both above and below. Length of spiral two inches, of ten-carat gold—*never silver*.

Amalgam alloys were so unsatisfactory twenty years ago that I would not use them, except in rare instances. Six years ago there were one or two good ones for sale. To-day there are better ones than six years ago. We have a right to expect that far better

filling-materials will be used ten years from now than we are able to obtain at the present day. We especially need an improved "bone" filling.

I take pleasure in saying that I have made and am using an amalgam alloy which is perfectly *alcohol-tight*. Aniline alcohol is entirely kept out of glass tubes filled with this alloy. In Dr. Flagg's book on "Plastic Fillings" is hinted the use of zinc, and to that I am indebted for using zinc in the formula which proves to give such satisfactory results. My formula has not been published, and I take pleasure in giving the Wisconsin State Dental Society the first written formula. My new alloy is made as follows: Melt forty pennyweights of pure silver; add to this thirty pennyweights pure tin; stir it, then add five pennyweights of antimony and five pennyweights of pure tears of zinc. When mixed, add thirty pennyweights of pure tin again; stir, and throw on the surface of the "melt" one-half ounce of beeswax to burn off; and while burning, pour the "melt" into the *cup* of a vulcanizing flask to *cool*. Cut it up with very coarse file. Remove every particle of iron with horseshoe-magnet. This amalgam must be washed in alcohol while mixing with mercury. Squeeze it in dry buckskin. This amalgam is *whiter* for washing, and takes less mercury. Squeezing injures some amalgams; it does not hurt this. The amalgam pellets must be dry when placed in the cavity. This amalgam remains very white in the mouth. If *all* the tin should be melted at once, the antimony and zinc would never melt. If the antimony and zinc are put in the melted silver before the tin, then the antimony and zinc will burn up or oxidize. Varnishes seal up the ends of tubuli. The *gum* in the varnish is a poor conductor of heat and electricity. Gold fillings, being generally *leaky*, are improved by varnishing with sandarac alcohol, before they get wet with saliva or water. The varnish seals up the *leaks*, and becomes semi-hard by after-contact with the saliva. Leaky amalgam fillings are much improved by the same operation.

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### OPERATION FOR NECROSIS.

(Performed before the New Jersey State Dental Society, July 21, 1881.)

BY DR. GEO. A. MILLS, BROOKLYN.

THE patient, a robust young man of about thirty years of age, I had not seen until a few hours previous to the operation. The history of the case is briefly this: About eight years ago, while splitting wood, he was struck in the mouth, knocking out, as he supposed, one of the upper incisors. Inflammation set in, followed by a discharge of fetid pus, mostly through an opening into the left



nostril. He fell into the hands of a dentist who diagnosed the adjacent tooth to be the cause of the trouble, and extracted it. The patient obtained no relief, and the discharge of pus continued up to the time of the operation. About three months ago, the case came to the attention of Dr. Charles Hubbard, of Brooklyn, who diagnosed necrosis, but did not discover the cause of it until he learned of the accident above mentioned, and that the tooth which was supposed to have been knocked out had not been found. Ascertaining by probing that it was still remaining in the jaw, he transferred the case to me for operation. I dissected away the gum-tissue attached to the upper lip, making an incision about one and a-half inches long. Dissecting back, I discovered a necrosed condition of the parts contiguous to the buried tooth. With a bur in a surgical engine, I enlarged the orifice in the direction of the tooth, which was lying in an oblique direction, nearly half an inch above the apex of the left cuspid, and between the point of the root of the cuspid and the left portion of the base of the nose. It proved, on further investigation, that the tooth had been driven into the transverse process between the two plates of the superior maxilla. By cutting away the portion of the bone to the left of the foreign body, and enlarging the opening sufficiently for its ultimate removal, after stopping the hemorrhage and drying out the cavity, the cutting edge of the tooth was readily discovered. An attempt was made to remove it with forceps, but it slipped back into the enlarged cavity which had been created in the vicinity by diseased action. Two hooked instruments were then employed and its extraction effected. It was quite extensively fractured on the cutting edge, and necrosed some three-eighths of an inch from the apex back upon the body of the root. One curious circumstance was discovered after its removal, which was, that the gum-tissue surrounding the neck of the tooth when in its normal position, had been partly stripped from its attachment to the process, and carried with the tooth into the location in which it was found, some slight connection with the myxomatous tissue being maintained, which had sustained its normal condition of vitality through all these years. After removing the tooth, the cavity was syringed out with lukewarm salt water, and quite an amount of broken-down tissue was forced out through the opening into the nostril. Dressing with a weak solution of arnica and water, the flaps of the wound were laid together and covered with a pack of cotton. Of the final recovery and entire healthfulness of the parts there is no doubt, and without disfigurement that will not be entirely remedied by the insertion of two artificial teeth. The operation was performed without the administration of any anesthetic, and occupied about three-quarters of an hour.

## PROCEEDINGS OF DENTAL SOCIETIES.

## AMERICAN DENTAL ASSOCIATION—TWENTY-FIRST ANNUAL SESSION.

SECOND DAY.—*Morning Session.*

THE consideration of the report of Section IV. was resumed, and Dr. G. J. Friedrichs, New Orleans, read a paper on "Cylinder-Filling," after the method introduced to the profession by Dr. John S. Clark in 1855, which, the writer stated, was received at the time with indifference. The essayist demonstrated, first, the manner of preparing the cylinders; second, the instruments necessary to pack them; and third, the manner of introducing them so as to make an impervious and solid filling.

If a sheet of foil be folded upon itself, we have a sheet parallelogram-shaped, of one-half the original size, but double the thickness. Repeating the process five times gives a strip of foil thirty-two times the original thickness; the flexibility decreasing as the number of layers increases. Therefore, to make small cylinders and yet have them soft and pliable, the sheet must be cut before folding into halves, thirds, fourths, etc. The smaller sizes are not in the market, and the writer believed that in the lack of applicability of the cylinders prepared for sale, was to be found the reason why this method of filling has not been more generally adopted.

The instruments necessary to the production of cylinder-fillings as taught by Dr. Clark, are similar in shape to Nos. 19 and 20 of Redman's set of pluggers. They are round-pointed, the shank bent at an angle of about thirty-five degrees, slightly tapering from shank to point, and spring-tempered. At least a dozen sizes are required to form a set, the smallest to be about the diameter of a cambric needle, the next a third larger, and so on, the length from shank to point to increase proportionally with the diameter.

In making a cylinder-filling, the first cylinder should be as large as can be conveniently introduced into the cavity, and of sufficient length to extend from the bottom of the cavity and protrude a little from the orifice. This is placed in the cavity, care being taken that it does not choke, but extends clear to the bottom. With the largest-sized instrument that can be used, it is then forced against the parietes of the cavity, thus providing space for the next cylinder, which is introduced and forced to place in the same manner, and so on, until the cavity is full, although not densely packed, when one of the small-sized instruments is forced between the cylinders, the opening thus made being enlarged by the introduction of the next larger-sized instrument, and another cylinder is introduced. This process

is repeated as often as is necessary, the gold being packed as solidly by lateral pressure as in the judgment of the operator the tooth will stand. After this the surface is condensed, dressed down, and polished.

The points of excellence of this form of filling were summed up as follows :

*First.* A lamina of gold extending from the bottom to the surface of the cavity, making it impossible for a cylinder-filling to come out piece-meal—it either comes out *en masse*, or it stays where it is put.

*Second.* The lateral pressure on the soft gold will produce a perfect adaptation to the parietes of the cavity.

*Third.* Where the tooth is strong enough to bear the pressure, a solid and impermeable filling can be put in by lateral pressure alone.

*Fourth.* No retaining pits are required.

*Fifth.* Rubber-dam may be dispensed with; and matrices are not required in filling approximal cavities, the protruding ends of the cylinders furnishing material for the desired fullness.

*Sixth.* Submarine fillings may be made.

*Seventh.* An impervious filling can be made in less time and with less labor and more certainty than by any other method. After the cavity is prepared and the cylinders are made, any cavity, no matter where situated, or whether large or small, may be filled, ready for condensing, in ten minutes.

Difficult cavities become simple ones when cylinders are used. An artificial crown cannot be built up with them; but whatever else can be done with gold for the preservation of the teeth, may be effected with cylinders. When crystal foil or cohesive gold is used those only succeed who take sufficient time to pack the gold carefully against the parietes of the cavity in small quantities; unless this is done no amount of malleting afterwards will make a perfect filling, as the mass has a tendency under pressure to contract rather than spread. A cohesive filling remains in contact with the parietes of the cavity from mere adaptation, while a cylinder-filling is maintained in position not only by adaptation, but by the tension of lateral pressure besides.

The only method by which a root-filling can be made with certainty is on the principle of cylinder-filling,—the gold rolled into a cone, becomes a part of the instrument. The first cone is introduced with the foil-carrier, and a piece of untempered steel, an inch and a-half long, the thickness of a darning-needle, and tapering to a point, is forced up beside the gold with a pair of flat-nosed pliers, making room for the second cone, and so on. The cones are prepared by rolling strips of foil on a watchmaker's broach.

From the economic stand-point, the skilled labor and time em-



ployed are the valuable factors in the filling of teeth; the value of the material used is comparatively of no consequence. Therefore, a sufficient number of fillings put in at even moderate charges will return a fair remuneration; but if it takes three hours to insert a filling, the fee must be in proportion to the time and labor expended. Hence the cry on the part of a certain class for a cheaper material, on the plea that gold-work places the services of the dentist out of the reach of the majority of the people. Then again, packing or malleting for hours makes your patients suffer the torments of the damned. The consequences are that gutta-perchas, oxychlorides, and amalgams are invoked, and these are placed on a par with a material that has stood the test of time.

The Section was passed temporarily, and Section III. having reported through its chairman, Dr. Taft, that it had no report on Dental Literature, the report on Nomenclature, which had been laid over, was discussed.

Dr. Atkinson was aware of the depth of the subject. The paper was but a continuation of the reports of previous years. He had brought the system before the association because he was convinced that S. P. Andrews had the key to enable men to explain clearly what goes on in their minds. It is not yet complete, but those who had read the previous installments were in position to follow the reading. If we can get at any means by which we can pronounce accurately the processes of our own minds, we shall be vastly the gainers.

Dr. G. F. Waters regretted that he had not heard the paper read. He had given considerable thought to the subject, and he esteemed the author of the system an inventor,—a discoverer in that line, as much as he who invents a new instrument, or a new machine, or a new use for any article. When a new idea is presented, men do not accept it, because it conflicts with use and wont, and they do not get its full significance, as long as they continue so disposed toward it. It is just as true as that we are here, that somebody will take this subject up and carry it forward to completion. Here is a man who all alone has grappled with it and done good work. He hoped that the author would give a *résumé* of the paper, and that then they would be able to see something in it.

Mr. Stephen Pearl Andrews, by invitation, spoke of the relation that sounds, lying at the bottom of language, have to the dentist's profession. The sounds known as dentals are made by crowding the point of the tongue against the upper teeth. A peculiarity of English-, compared with German-speaking peoples, is that the former are very firm in the application of the hard to the soft parts of the mouth in speech. There are three great seats of sounds: The back-mouth, or

throat; the middle-mouth, the dental region; and the front-mouth, where the lips are brought together. The speaker gave illustrations of the difficulty of making certain sounds in any other than the natural manner. The mouth is like a musical instrument with so many keys or touches; so that for all languages, it is only necessary to have one small alphabet,—a little larger than that of the English language. One of the principal purposes of a good denture, is to enable the person to pronounce properly. If the dentist does not understand the mechanism of speech, he is not properly educated. Dentistry and linguation are closely related, a relation which is clearly shown in the linguo-dental sounds.

Section III. was passed, and the discussion of Section IV., Operative Dentistry, was resumed.

Dr. George A. Mills, Brooklyn. We will have to take it for granted that there is a modicum of good in all the methods of filling roots that have been presented. Each man operates in the way which best suits his capabilities, and all have presumably a satisfactory degree of success. He would not question Dr. Wetherbee's ability to do with gold what many other men cannot do with the same material. Dr. Atkinson's demonstration of the principle on which we should work, it would be well to carry into practice as a rule of conduct; when we come to difficulties we must invent our way out. It is not the material, nor the method, *per se*, but the man behind the instrument that is to be depended on. The wide variation in methods,—always successful in the hands of those who advocate them, "never a failure,"—shows us that we should be eclectic in practice, and taking all classes put our common-sense into the operation. What information we receive from contact with others, let us put into practice and prove or disprove it.

Dr. W. F. Litch, Philadelphia, considered Dr. Atkinson's method an admirable one. Oxyphosphate, where practicable, is better than gold, because of its antiseptic properties. A tooth with a putrescent pulp is essentially a tooth saturated with putrescent tissue. The anterior root of the lower molar frequently has a slender filamentous pulp-canal, in which it is extremely difficult to get the carbolic acid to the apex to neutralize the putrescent condition; in such cases it is better to drill out, which will avoid trouble. He thinks it would be difficult to pump gutta-percha into the canals of upper molars against gravity. There is also danger of some of the material getting out through the foramen, and setting up inflammation. To make a proper root-filling, it is necessary to have something to fully close up the pulp-canal. Gold is not so good for the purpose as gutta-percha, which need not be pumped in but can be pressed in with a hot instrument. One difficulty in pumping it into the canal

is that the solution evaporates so rapidly. He has had failures only where the pulp was devitalized previously.

Dr. E. S. Niles asked how the oxychloride in a root-filling was disintegrated.

Dr. Wetherbee. By absorbing the moisture in the dentine, or, through the foramen, from the soft tissues.

Dr. Niles. Oxyphosphate is liable to the same disintegration when mixed to the consistence of cream; it is to some extent soluble, which must be objectionable. Some moisture must come down from the soft tissues, especially if the opening has been enlarged. The solution of gutta-percha is more acceptable, because it forms a compound insoluble in the fluids contained in the tissues, and its durability is certainly better. Dr. Litch's objection to its use is untenable, because the solution would find its way by capillary attraction.

Dr. H. C. Meriam, Salem, Mass., said it seemed to him that those who had spoken picked their cases; his patients came to him. [The speaker sketched on the blackboard a molar with curved roots and a cavity on the distal surface, and asked how he should get into the anterior root.] He had used the oil of cajeput as a solvent for gutta-percha, and it proved an excellent substitute for chloroform, giving all its advantages without evaporating too soon.

Dr. M. H. Webb, Lancaster, Pa., said, in reply to Dr. Meriam's question, that by opening through the crown he could get at both pulp-canals.

Many of the roots which present are those in which the pulps have been killed or have died. Where the pulps are dead and not putrescent, if the rupturing of the vessels in removing the tissue causes bleeding, the end of the root should be closed at once. When the pulps have recently died, gold is the best material. Whenever a broach can be got to the end of the root, the foramen can be closed with gold. When the canals are small, use light gold cut into narrow strips, folded once, or into three thicknesses. Get the root thoroughly cleansed and close the opening with gold. The next best material is fibers of cotton saturated with carbolic acid. Do not press it too much—just enough to know that you have got it to the right place. After the foramen is closed, fill with oxychloride, making sure that you get it clear up to the gold. You can build so as to make it as strong as gold wire. The advantage in using the oxychloride is that it prevents the putrescence of the living matters from the dentinal canaliculi. Where an abscess has formed at the end of the root, it is necessary to drill through the end of the root and make a fresh wound so as to cause healing by first intention. A temporary filling may be inserted, to be followed as soon as the



parts are healed by a permanent operation. Never put in a permanent filling until you know the parts are ready for it. Gold wire may be used for this; in which case measure carefully the length required and put it up to place with oxychloride around it. When you cannot reach the end of the root with a broach, it may oftentimes be accomplished with drills. Take the finest Gates drill and follow up the canal to the end and then enlarge with other sizes. He does not think it well to drill as much as is done, and does not believe in cylinder-fillings. The better way in his opinion is to fill the bulbous portion of the pulp-chamber, and a good portion of the cavity, when it is desirable, with oxychloride. Then fix a point to secure the filling, start it with hand-pressure, and complete with gold packed by the electro-magnetic mallet. Filling teeth is delicate work. You cannot do it as you would tumble potatoes into a barrel. If cylinders are used, they should, of course, be of non-cohesive gold, because if cohesive, they would stick together and prevent the results claimed for them by their advocates.

Dr. T. D. Shumway, Plymouth, Mass. In regard to moisture in the canals, a little alcohol will absorb all that in about a half minute. Dr. McKellops made the point that nature made the hole; it is our business to fill it with the material best adapted to the purpose. If you put in a foreign material, nature must throw it out before a cure can be effected. He would not mallet a tooth for any one, nor would he allow any man to use a mallet on one of his own teeth—that is, to stop decay. It is a dangerous tool to use. There is no remedial virtue in it; there is in a cylinder-filling. In order to get the best results, we must have a filling that is compatible with the process going on in the tooth. There would be just as much sense in an oculist using a mallet on the eye as in the dentist's use of it in filling teeth. The process of dissolution is the same in nature everywhere. A cylinder-filling is made up of laminæ or scales, and they allow recuperation to go on in the tooth. Just as sure as you begin malleting a filling, so sure it begins to contract or crystallize.

Dr. C. S. Beck, Wilkesbarre, Pa., gave an account of a case of a superior lateral incisor, in the mouth of a patient of good physique, with no vices. It had a small filling in the lingual portion, and an abscess at the root. He opened down to the pulp-chamber, and with a Gates drill followed the canal, and before he was aware the point was through. Pus followed its withdrawal. A probe found roughened edges, and he thought the bone was decayed. It was syringed with carbolic acid and water with no effect; a ten-grain solution of chloride of zinc also produced no result. He then tried simple wood creasote for six weeks, applied every other day. When the pus ceased discharging he inserted a pledget of cotton, satura-

ted with carbolic acid; then filled the cavity with gutta-percha, and the patient has since (now eighteen months) had no pain or trouble, and there is every reason to believe the operation will be successful. As to Dr. Shumway's reference to the use of the mallet on the eye, there was no comparison between that organ and a tooth. The eye was much more sensitive. He would sooner part with any other instrument than his electric mallet.

Dr. Shumway. It is simply a question of methods. The speaker made no claim to originality, but there was a method of preparing cylinders which he thought a little improvement over the old way. Both gentlemen who have spoken of cylinders have said cylinders made of non-cohesive gold. He supposed they meant unannealed foil, which could be made cohesive by heating.

Dr. Beck. Is not virgin gold cohesive?

Dr. Shumway. It has the cohesive property undeveloped. [Dr. S. showed his method of preparing cylinders, which consisted in rolling a sheet of foil between two pads, until the cylinder was formed, which was then cut to lengths suitable for the purpose in view. He stated that cylinders by this method could be made just as hard and compact as the operator chose.]

Dr. Wm. Barker, Providence, R. I. The theory of cylinder-filling is that the cylinders in the cavity much resemble cigars in a glass. He finds it is desirable that the last one should be very hard and small. Would Dr. Shumway, in filling by his method, roll this last cylinder in this way?

Dr. Shumway. No. I do not make a perfect cylinder-filling, as described in the paper read by Dr. Friedrichs. I make a base with them and cover this with cohesive gold.

Dr. W. T. La Roche, New York. Dr. Shumway's cylinders are not properly cylinders; they might be called pellets. Clark's method of preparing them was by rolling the foil about a broach. When used properly they are put into the cavity like cigars in a tumbler, and pressed together. This of Dr. Shumway's is more like a pellet.

Dr. R. R. Andrews, Cambridge, Mass. Dr. Shumway's fillings are not strictly cylinder-fillings. He rolls up No. 4 foil of a single thickness, and then with ivory points burnishes it on to the base he has made.

Dr. J. N. Crouse, Chicago. It does not matter what roots are filled with, so that it is well done, and the filling is indestructible. There are many teeth in which the pulp has been dead for some time, and where there is suppuration, which you can cure better by drilling through the foramen and bleeding, and getting a fresh surface. Gutta-percha carried to place with a fine broach does not evaporate

too quickly. A good plan is to take a small piece of the gutta-percha and start it up the canal; then take a small piece of gold foil around a fine broach, put it over the flame of a lamp, heat it red-hot, and then shove it up before it has had time to get cool, turn the instrument and leave the gold there. When a hot instrument is used without some such precaution, the gutta-percha is sometimes pulled out when the instrument is withdrawn.

He was glad to hear the clear and logical reasoning of Dr. Friedrichs on the subject of cylinder-filling. Last year its advocates were, so to speak, kicked out. He was glad to see that there were young men who use this method. We ought to retain it as long as we have nothing better to take its place, as we have not to-day. He will fill a cavity with cylinders while the cohesive gold man is getting ready to begin. What we want is that which will be the least expensive to the patient, and the least wearing to ourselves. The man who uses nothing but cohesive gold does not do quite the right thing by his patients. Tin foil used in connection with gold is another excellent material. For the cervical margins of approximal cavities, he knows of nothing better than a good cylinder. It is more ductile than any other form, and goes to its place with less force and with more certainty.

Dr. Wetherbee. The issue at the last meeting was as to whether as good a filling could be made with soft gold as with cohesive. Let us look at what are cylinders. There are round cylinders and flat cylinders, so called. The flat cylinders are made by folding the leaf of gold foil upon itself. The proper method, according to his estimate, is to make the cylinders in the form of pellets. Starting at one side, impact thoroughly against the wall, and build until three-fourths or seven-eighths of the distance across the floor of the cavity is covered, then fill in with small cylinders to the top. These cylinders are simply annealed, without destroying the softness of the gold. With reference to root-filling in teeth with bifurcated roots, where it is impossible to drill up through the pulp-canal, the better way is to drill through the gum to the root, and let out the pus; treat the abscess and then fill with gold. It causes less pain to the patient. With reference to planished fillings, Dr. Shumway has the privilege of practicing as he chooses, if the results are up to the standard demanded. If I have a tender tooth to treat, I take the mallet—not because I cannot do the work with hand-pressure skillfully, for I profess to be master of both methods. When I first began, patients objected; now forty-nine out of fifty prefer the mallet. When using the mallet the instrument never slips; with hand-pressure it sometimes does. Another advantage is that your attention is directed only to the guidance of the instrument.



Dr. S. B. Palmer, Syracuse, N. Y., advocated the use of tin and gold combined for filling teeth, though it is not suitable to teeth in which gold alone would not be useful. A tooth is composed of twenty-eight parts of cartilage, or conducting material, and seventy-two of lime-salts. There are, of course, variations from this proportion owing to difference of quality. Gold is to be used wherever it is proper to use it, but in young teeth or in those not suitable by reason of a lack of density of structure, it should not be used. If a filling of gold is made in teeth of this description, you will need to do it over in two years. Gutta-percha works well for about two years. Cases are occurring all the time where, after a tooth has been treated with amalgams for four or five years, you can put in a gold filling with every hope of permanency. We are getting rid of the desirable qualities of our amalgams in our efforts to produce finer materials. There is only one redemption in some of the later amalgams, and that is in using them drier, and getting as close adaptation to the walls as possible; but the closer they approach to gold, by reason of incompatibility with tooth-structure, the more they lose of the qualities which made the earlier amalgams so useful—teeth filled with them being found actually harder and denser under the plugs after a time than when the fillings were inserted. When teeth are filled with tin and gold, after the method advocated by Dr. Abbot, of Berlin, the tin and gold lose their identity from some molecular change, making the filling look like amalgam. Line the cavity with one or two layers of gold and tin and complete the filling with gold, and you will do it right. Though no mercury is used, there seems to be an interchange of particles. In large cavities in molars he uses tin and gold rolled together, with very satisfactory results. He asked practitioners to try these methods, especially the younger men.

Adjourned.

(To be continued.)

#### NATIONAL DENTAL ASSOCIATION OF THE UNITED STATES OF AMERICA—SECOND ANNUAL SESSION.

THE National Dental Association of the United States of America began its second annual session in Republican Hall, New York, Monday, August 8, 1881. Dr. A. L. Northrop, President, in the chair.

##### FIRST DAY.—*Morning Session.*

The morning session was devoted to routine business.

Dr. F. M. Odell announced that a complimentary excursion to Long Branch would be given the members of the association on Wednesday by the steamer City of Richmond.

Dr. R. B. Winder, from the committee appointed to secure the recognition of the Government, and its aid in forwarding the objects of the association, reported that the committee had called on Prof. Baird, of the Smithsonian Institution, and they had every assurance of permanent quarters in the Institution; there was also every probability that a place would be permanently provided for a museum, under the charge of the Medical Bureau. The Surgeon-Generals of the army and navy also have agreed to have any statistics within their power prepared in reply to questions from this association.

Dr. J. Curtis Smithe, Washington, D. C., corroborated Dr. Winder's statement. The gentlemen with whom the committee had communicated had expressed themselves as willing to render any assistance in their power.

Adjourned.

FIRST DAY.—*Afternoon Session.*

Dr. F. M. Odell read a paper on "Lithiasis," of which the following is an abstract:

Whenever the proper and perfect elimination of the products of the retrograde metamorphosis of tissue is interfered with, according to the extent of that interference pathological conditions immediately supervene. Whenever there is deviation from regular progression in functional perfection in any of the processes of digestion or assimilation, pathological sequelæ may be confidently anticipated. Of these facts, one constituent of the peptones resulting from the process of stomach-digestion, starch, is a marked illustration, during its transformation into sugar through the several chemical changes involved; resulting finally in the production of body-heat and tissue-regeneration. The arrestation or perversion of any of these processes is productive of pathological conditions evidenced by more or less pronounced symptoms, and in many instances pointing with unmistakable clearness to the cause of the ailment and therefore giving indications for treatment. In nearly every one we may trace either the deprivation of certain of the tissues of their needed alimentation, or super-alimentation,—the first synonymous with starvation, the second with repletion of tissual elements. Again, if we have arrestation of the processes, a loading of the various circulations with abnormal productions results, calling for increased effort on the part of the natural emunctories, or setting up vicarious emunctories. Hence, arise the various so-called diseases, as arthritis, chalky deposits, anchylosis, bronchitis, asthma, emphysema, pleuritis, diabetes, oxaluria, rheumatism, and gout or lithiasis.

Dr. Odell remarked at the conclusion of the paper that it was not presented as complete, but merely as containing suggestions on a subject which should be discussed. He hoped to complete the paper at

a future time. Continuing, he said: These various ways by which the normal action can be arrested or prevented are among the causes from which people suffer at this period of the year. Various manifestations are given, but they can all be traced to one predisposing cause—inadequacy of function somewhere in the processes. If the action is interfered with at the glucose stage of the processes, we have too much sugar in the blood, which causes diabetes mellitus; if at the dextrin stage, we have diabetes insipidus; if further on, at the oxalic acid stage, we have oxaluria. One who has diabetes mellitus takes soda or something of that sort—more sugar—when his system has already more sugar than it knows what to do with. When it came to the speaker's lot to prescribe for such conditions he always gave plenty of water. In cases of stoppage of the nasal passages he had found relief from smoking a cubebs cigarette—only a portion of it, however; if you keep on smoking, it becomes a violent stimulant. A difficulty with the eyes and skin—if a high temperature is long maintained—is one of the most aggravating disturbances. An excellent application is ordinary bicarbonate of soda. The trouble in these cases is urea—we have almost gotten through the processes, and the trouble is right where we can reach it with a local application. The indication is simply to use the remedy wherever the skin becomes irritated, and you will have almost immediate relief.

Dr. R. Finley Hunt thought the paper as important in its subject and relations as any that could be read before this association. In its opening sentence it strikes the key-note of all we have to practice in medicine and dentistry. One result of investigation into these subjects is the conclusion that one cause of pathological conditions in the human race is to be found in incomplete supply of aliment to the tissues. But we should not confine ourselves to deficiencies of alimentation as the sole cause. He thinks the true cause is to be found in arrestation of the proper functional distribution of the elements introduced into the system. His opinion could not be more succinctly stated than it is in the opening sentence of Dr. Odell's paper.

Dr. John Allen was glad that our branch of the healing art could take up and comment on such a subject in the manner of this paper. We might be able to do more good than we are by considering such subjects in their pathological relations.

Dr. M. L. Rhein, New York, read the following paper on "Dental Education:"

It is a melancholy, though generally conceded fact, that the present position of the dentist is very equivocal. The better class of dentists claim that they are practicing a specialty in medicine,



while many medical men decline to recognize them, except they are graduates of a regular medical college, ignoring the diplomas granted by dental institutions, unless backed by a medical degree.

The medical profession have become satisfied that specialists are a necessity; that the human organism is altogether too complex to be perfectly studied by any one person, and that the science at large can only be perfected by those who devote themselves to the study and treatment of special diseases or organs.

It is true that within the last few years, the increased knowledge of the formation of the teeth, the diseases to which they are subject, and their relations to the system at large, have forced the medical profession to give at least a passing notice to dentistry. Are not the teeth as much a part of the human organism as the eyes or the ears? Yet, while it would be considered absurd for any one to attempt to practice ophthalmology or otology without having previously completed a medical course, thousands are irremediably injured by persons practicing dentistry, openly, and in full compliance with law, without a particle of knowledge of anatomy and physiology. It follows that it is the duty of the medical profession to recognize dentistry as a branch of medical practice. A glance, however, at the history of dentistry will show that the so-called independent spirit of the dentist has, in a great measure, contributed to alienation from his brethren in the healing art. Dental colleges all over the country have graduated dentists and conferred degrees of "doctor in dental surgery" without requiring a complete medical and surgical education. That such a course is radically wrong is apparent, and while it is continued, the medical profession will very properly refuse professional recognition to a person possessing only such a degree.

Dentists study certain branches which are either wholly overlooked or only imperfectly taught in the regular medical schools; on the other hand, many medical branches of equal importance to the dental practitioner, are not included in the curriculum of our dental schools.

It is absolutely necessary, in order to properly comprehend the relations which the teeth bear to the rest of the system, to understand the delicate organization which controls every part of the human frame. From the very inception of the human being, dentition plays an important role in the animal economy. The troubles arising from the oral cavity are by no means confined to childhood and youth. It is but proper that a dentist should acquire sufficient knowledge to enable him to make a correct diagnosis of tumors, abscesses, and various types of neuralgia, dyspepsia, etc., all of which he is likely to meet with at every stage of his professional

career. Surely the lack of such knowledge will but make quackery rampant, for who of us is willing to acknowledge his ignorance in matters so closely connected with his practice.

We are, as I before stated, becoming more closely assimilated to our medical brethren every day, and it is our duty to hasten the period of our advancement as much as possible. The obstacles which stand in the way have already been referred to. They are: Firstly, the fact that students of dentistry are not taught enough of medicine, and that dental colleges can confer only a partial degree. Secondly, that students of medicine devote absolutely no time to the proper study of the teeth. Thirdly, that practitioners of dentistry and of general medicine have each failed to recognize the importance of the other's knowledge.

Students desiring to practice dentistry as a specialty should acquire a thorough knowledge of the science of medicine and surgery preparatory to entering a dental college, and then pursue the study of practical dentistry, and its allied branches, to completion. Nor is the day far distant when one of the necessary qualifications for admission to any reputable dental college will be that the applicant must be a graduate in medicine. Such an assertion may seem folly in the eyes of many practicing dentists, but we can only expect an important step like this to be taken after mature consideration; but taken it must be, sooner or later. The recent and constant improvements in the curriculum of our dental colleges, among them the recommendation that students shall spend a third term at a medical college, for the purpose of acquiring the degree of doctor in medicine, are steps in the right direction, and point to the ultimate accomplishment of the desired result. This plan is like attempting to build a house before the foundation is laid. When the change I have indicated is adopted, the benefits will accrue not only to the patient but also to the conscientious practitioner. Then will the dentist be prepared to meet the emergencies which now frequently perplex him; nor will he be restricted to the mere saving of teeth, but he may enter the broader fields of oral surgery.

It is frequently asserted that it is not necessary for practitioners in medicine to devote any attention to the teeth. That this is an error, is shown by the fact that prior to Sir Charles Bell's investigations, the sensibility of the face was supposed to be presided over by the facial nerve; which was believed to be the seat of the painful disease, *tic douloureux*. Division of this nerve was frequently practiced, resulting only in paralysis of the side of the face operated upon. It is now, however, well known that the trigeminal or fifth pair of nerves is involved in this affection. Physicians frequently treat patients suffering from neuralgia with-

out satisfactory results, when treating an exposed pulp, or extracting an offending tooth, is all that would be necessary to relieve the excruciating sufferings of the patient.

Disease of the dental tissues frequently gives rise to constitutional troubles, and most of the affections of the oral cavity have more or less connection with the teeth. But little reflection is needed to convince the enlightened physician how much more efficiently these could be met and overcome if the medical practitioner possessed even a rudimentary knowledge of the teeth. An elementary study of the anatomy, physiology, and pathology of the eye and ear is an essential part of every medical course; and it is an accepted fact that the student who intends to make a specialty of the treatment of these organs must pursue his studies beyond those of the general practitioner. These studies are, however, required for the information of the latter class on account of the relation which these organs bear to the rest of the human frame, and not to oblige him to treat such diseases, as the general practitioner invariably hands over such cases to the specialist. Why, then, should not the elementary principles of dentistry be introduced into and made a part of a medical education, and *vice versa*, a general knowledge of medicine and surgery made a necessary prerequisite to graduation from a dental college.

It is a duty which the medical colleges owe to suffering humanity to recognize the importance of giving their graduates a broader comprehension of dental matters.

It is the duty of the State, by means of stringent though equitable enactments, wisely administered, to prevent any but those duly qualified from practicing this specialty in medicine; as indeed has been done by the Legislatures of many of the States during the past few years.

It is the duty of the dentist to prove, by sincere and earnest study, his desire and ability to take that place in the medical profession which, eventually, he will occupy with credit to himself and benefit to humanity.

Dr. R. B. Winder, Baltimore, thought the two professions could not be fused. Medicine is founded on anatomy, chemistry, and physiology. Dentistry has for its foundation all these, and in addition to them, mechanics and artistic taste, and because of this radical difference you can never bring them together. In all medical colleges in which dentistry is taught, different degrees are conferred upon those who are to practice dentistry from those whose intention it is to follow medicine. When you speak of dentistry as a specialty in medical science in the broader sense of the term, he would grant that it is; but dentistry has no such part in M.D.-ism: it is essentially distinct. The two professions must work side by side. Den-



tistry has come to what it is by its own unaided efforts. When Harris and his confrères applied to the medical colleges in Philadelphia and Baltimore to have dentistry taught as a specialty in medicine, their application was refused, and hence came the schools specially devoted to the preparation of students for the practice of dentistry. The ground covered by general medicine is too large for it to take in any more. For this reason, medicine is about breaking up into specialties,—because of the growing need of special practice. He would not restrict any man's knowledge. The greater his attainments, the larger man he will be. But medicine is large, and dentistry is large—too large for both to be included in the common term.

Dr. Rhein said he did not have reference so much to the degree as to the amount of knowledge which should be essential to the practice of dentistry. In his paper he had stated that the dentist should first be educated in the groundwork of dentistry,—anatomy, physiology, and chemistry. The best men in medicine are practicing specialties. He simply claimed that dentists should be educated the same as other specialists.

Dr. Winder. The medical school of the Johns Hopkins University will require from students of medicine in the first place graduation in these three fundamental branches. Pathology and therapeutics are parts proper of M.D.-ism. Prof. Huxley had stated that medicine had not made greater progress because it had undertaken too much; he deprecated specially that it had ever meddled with *materia medica*, which belongs or ought to belong to the domain of the druggist exclusively.

Dr. F. M. Odell. We have got first to observe the physiological processes, then the pathological processes, and then by being chemists to know what will forward or obstruct these processes. In what is known as regular medicine, practitioners study symptoms in order that they may get at their causes, which is the objective point in treatment. Believers in high potencies treat symptoms, never remembering that what they are after may have already gone. He believes in treating what he can get hold of.

Dr. J. S. Marshall, Syracuse, N. Y., claimed that none should be allowed to practice dentistry except they had a medical education. There is nothing in the medical course superfluous for the dental student. He represents a college which gives a course of lectures on dental subjects in connection with its medical teachings. The time is not far off when the public will oblige dentists to be medically-educated men. The action of the American Medical Association at Richmond in organizing a section on dentistry was an evidence of this.

Dr. R. Finley Hunt. The importance of the subject is indicated by the attention it is receiving. We are all impressed with the feeling which gives rise to these papers—that a more thorough education for the dentist is a necessity of the times. The question is, What is the best way to meet it. Some claim that students should be educated as dentists only; others that the dental schools should be wiped out, and the medical education be made to cover all. The proper way is not to give a medical education separate from the dental studies. There is not a dental college in the land that does not profess to give students sufficient medical education to make its graduates competent to treat patients constitutionally when such a course is indicated. His plan is, not to go outside of the dental schools, but to enlarge their curricula, so as to fit graduates to deal with any emergency they may be called upon to meet. We profess to teach all that is necessary now; if we do not, let us improve the course and make it include what is necessary.

Dr. J. G. Ambler, New York, indorsed the sentiments of both papers that had been read. There should be no controversy between Dr. Rhein and Dr. Winder. Dr. Rhein had simply told them that a better education was necessary for the dentist, wisely omitting the method to be pursued. Medical education is as much at the foundation of our specialty as of otology or ophthalmology, and it would be well if all could go through the medical college. But it is not always convenient,—some young men cannot afford the outlay of time and money, and the matter should be so arranged that these can acquire all the required information outside of the regular beaten track. The idea that the dentist must of necessity be a medical practitioner is an error. If he understands enough of medicine to make him competent to perform what comes within his province, he has all that is necessary. The facilities for acquiring an education now are great, and they are becoming greater every day.

Dr. Rhein had noticed when at college that the dental students were devoted to the practical part of dentistry. They kept away from the medical lectures, and from the chemical laboratory. This was why he advanced the view that students of dentistry should take up medicine first.

Dr. J. R. Walker, New Orleans. The question seems to be whether the dental student shall pursue his medical studies first, and then take up what is left, or take the whole course at once. It is a fact that in medical colleges as at present organized, dentistry is neglected. He thinks the best way would be to make the dental colleges what they ought to be by enlarging their curricula to cover the ground necessary to enable them to turn out graduates fully competent for practice.

Dr. Rhein had learned that the Albany Medical College now gives dental lectures in its spring course, and it will probably put them into its regular course, when candidates for graduation will have to stand an examination in the subjects treated of.

Dr. Hunt had ascertained that there is a mistaken impression abroad with reference to this association. It is due to the association that it be corrected in the proper manner. He gave notice of his intention to offer a resolution authorizing the compilation and publication of a history of this body from its first inception.

Adjourned.

(To be continued.)

The election of officers was held on Tuesday morning with the following result :

*President.*—John B. Rich, New York.

*First Vice-President.*—J. B. Patrick, Charleston, S. C.

*Second Vice-President.*—J. H. Smith, New Haven, Conn.

*Third Vice-President.*—W. H. Dwinelle, New York.

*Fourth Vice-President.*—J. R. Walker, New Orleans.

*Fifth Vice-President.*—F. A. Levy, Orange, N. J.

*Assistant Secretary.*—F. M. Odell, New York.

*Assistant Treasurer.*—John Allen, New York.

The Secretary, Dr. R. Finley Hunt, and Treasurer, Dr. H. B. Noble, both of Washington, D. C., hold over.

The name of the association was changed to read "The National Dental Association of the United States of America."

The date of the next meeting was fixed for the Thursday following the first Tuesday in August, 1881, at Washington.

### NEW YORK ODONTOLOGICAL SOCIETY.

REGULAR meeting held at the residence of Dr. W. A. Bronson, Tuesday evening, May 17, 1881.

President, Dr. Bronson, in the chair.

#### INCIDENTS OF OFFICE PRACTICE.

Dr. W. H. Atkinson. I have an interesting case of the loss of the sockets of the lower front teeth. It was presented at the last clinic at White's depot, and taken charge of the next day. I removed the transverse process and treated with saturated solution of salicylic acid in alcohol. I tied the teeth that were loose with floss-silk ligatures, and have made a pocket fixture for retaining them in position, which I propose inserting to-morrow morning, with the hope of getting new sockets around, at least a part, and possibly all of them. There is a little doubt whether the pulp is alive in the



right central. All the others are living, and around them I have full confidence we will get new sockets by the securing of the pocket. Any one who wishes to see it is welcome. The case was noticed with considerable interest at the clinic, and good progress has been made thus far. There is really no pus discharging; nothing but protoplasmic matter which comes from the broken condition of the structures of the part. It sometimes breaks down a little, but a new growth has sprung up between the teeth to a considerable extent.

I have another interesting case which I have had in charge for over a year. In it the left superior cuspid was relieved and drawn down two-thirds of an inch into its place. The tissues are coming nicely; the patient is wearing a pocket, and the gum is nearly down to the normal limit. At one time it was below the normal limit, and if she had attended to it, it would have been finished before now. The process was formed more than half round the roots of the three teeth involved. These are merely specimens of many other cases that I have of great interest; and much of my satisfaction in dealing with them comes to me through the use of the pocket made of Reese's metal.

Dr. Mills. Have you the fixture?

Dr. Atkinson. I have not.

Dr. Brockaway. What medication do you employ?

Dr. Atkinson. No medication after the pocket is set on, unless it needs it, and I would judge only by evidences of inflammation, exudation, or discharge of pus.

Dr. Mills. Will you describe the fixture?

Dr. Atkinson. I simply take an impression and get a model of the jaw as it is. Then I build up a little in excess of what I want reproduced, and then cast the piece so as to conform to that, being sure there is enough room for the development of the festoons and the entire portion of the gum to envelop the teeth that are denuded of their support. It is not a matter of doubt with me, for I have succeeded in many cases under less advantageous circumstances. The treatment of these cases is like the treatment of any reproduction of tissue. It is just as important not to overtreat as it is not to fall short. We have more operations marred by overtreating and meddling than for any other reason. In the case I spoke of, the patient wanted to go to a party, and she slipped the plate off and left it off a couple of weeks. The tissue was not yet strong enough to stand such long exposure.

Dr. Mills. I had a case that I finished yesterday of a mistaken diagnosis. Two weeks ago a gentleman called complaining of pain about the roots of the upper molars. I thought it due to wasting

of the process. I treated for that, but there was trouble still. He went away but finally came back again, and placing his finger on the palatal side of the twelfth-year molar, he said *there* seemed to be the trouble. During the course of conversation he spoke of the spasmodic pain he had when he drew his tongue across the place, causing suction; that suggested probing under the gum of the palatal root. In doing so my probe dropped into a hole that made him jump. It was about three-eighths of an inch under the gum. I dressed with cotton and creasote, and lifted the gum so I could see there was an abrasion. I forced the festoon of the gum back with red gutta-percha. In a few days I took it away and found the hole was clearly in sight. I found the pulp exposed. After considering what I should fill it with, I resorted to amalgam. I thought cement might wash away, and gutta-percha would be an equally bad material. I placed my gutta-percha cap back where it would not interfere with the plastic material and left it a few hours. I hope now to succeed in keeping him comfortable, for he had suffered a great deal of pain. I have had only one case of this kind before in my life. In 1870 I had one of a third molar where I discovered a cavity on the anterior surface, under the gum, high up.

Dr. Howe. Are those cavities of decay?

Dr. Mills. I will not say what they are; I have seen similar cavities in teeth that have been extracted; sometimes they have almost cut the root off. The tissue was dissolved at these points by some chemical action. Last June a young lady came to me with wasting of the process and loosening of the teeth. The central incisor was so loose I expressed doubt whether I could do anything for it. I treated the remainder of the teeth successfully. The lady was out of health, and in September she went out of my hands to her physician for six months. She was suffering from some organic trouble. She came back five or six weeks ago, and this tooth was so loose I had to take it out. I found a condition of the root that made it objectionable to put it back as it was. I cut off the end of it, cleaned and smoothed it, and put it back and tied it with a ligature. It held very nicely. I finally made a little platinum wire yoke and bound it to the adjoining teeth, and made the tooth as firm as need be. It has a flesh socket instead of a bone socket. She will wear it for a time and then we will do something else.

Dr. Atkinson. Did you fill the pulp-canal?

Dr. Mills. In the end I do not expect a "nine years' lease."

Dr. S. G. Perry. Some of the gentlemen may remember that a few years' ago there was shown to this society, by Dr. Shannon, a case of a tooth that was readily put in and taken out by the patient. It was an inferior bicuspid, and rested only in the fleshy socket, and

yet was worn with comfort. The socket seemed cartilaginous and tough, and gave the tooth tolerably firm support.

A clinic was then given by Dr. T. D. Shumway, of Plymouth, Mass., illustrating his method of filling teeth with gold by the use of ivory points. A large approximal and grinding-surface cavity in an upper first molar was selected for the operation. After partly filling the approximal cavity in the usual way, with soft gold and hand-pressure steel instruments, a layer of cohesive gold was united to the mass, and then layer after layer of cohesive gold was rubbed on with the smooth ivory points. This was continued until the cavity was completely filled. When finished off the gold presented the appearance of a solid mass. The force applied to the whole filling was very slight, only enough pressure being exerted to rub each thin layer of gold in close contact with the smooth mass.

Dr. Shumway then read a paper on "Dental Surgery—Not Dental Mechanics."\*

*Discussion.*

Dr. Shumway. To illustrate the paper I have just read, I have with me a few specimens which I have prepared for examination under the microscope. I do not know that they can be examined very well to-night, but I will exhibit them. I have here a filling that was put in with the mallet by one of the best operators in the city of Boston. The tooth was decayed and acted badly, and the person came to my office and insisted upon its extraction. I took the filling out and broke it in two, and I want you to see how crystalline its structure is, and how nearly it corresponds with that of a piece of broken pebble, which I show with it. I have also a filling which I put in out of the mouth with ivory points, and which I will place by the side of a piece of modelling composition, so that you may see the similarity of structure, and then I will leave it to any one to determine which would be the most likely to preserve a tooth from decay.

Dr. Mills. What distinction do you make between what you call surgical and what you call mechanical?

Dr. Shumway. My idea is this, that an operation to be surgical must be remedial.

Dr. Mills. Why is one more remedial than the other?

Dr. Shumway. The mechanical operation must be artificial. This is an attempt to subject nature to the will of man and she refuses to be forced. I do not know why, only I see the same process going on in nature, controlling and governing all things. It is admitted that a better lamina can be produced with gutta-percha

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\* This paper will be found at page 449, current number DENTAL COSMOS.



than with amalgam. The more nearly you can approach that in an amalgam filling, the better you are off, and for that reason I put amalgam through three processes to get as near a laminated surface as possible. I have put in fillings at clinics, and because they could be dented with a lead pencil it was claimed they were not good. I have known fillings which I thought leaked that still preserved the tooth; whether such a filling fails or not seems to depend upon whether there is a recuperative tendency or a tendency to decay.

Dr. Rich. What evidence did you have that the tooth really leaked?

Dr. Shumway. When I have taken out such fillings there seemed to be evidence that they leaked; yet I do not know that I could say positively that they leaked.

Dr. Rich. That is a very important matter, if it is brought forward as evidence. It is not of course necessary for the filling to be solid and hard to preserve the tooth. We find many teeth that were filled thirty and forty years ago, when we filled with tin, where the filling is soft and yet the tooth-bone is preserved. They were no doubt tight-fitting.

The president, on behalf of the society, thanked Dr. Shumway for both the clinic and for the paper with which he had favored the society.

### SOUTHERN DENTAL ASSOCIATION.

At the recent meeting of the Southern Dental Association, held at Asheville, N. C., the following resolutions were unanimously adopted:

*"Resolved*, That the Southern Dental Association place itself on record as indorsing the principles of education as enunciated by the University of Virginia at its foundation, and of the Johns Hopkins University, of Baltimore, Maryland, of conferring degrees according to merit and previous acquirements; and that we indorse heartily the doctrine that a diploma from a dental college should be awarded to merit, and merit alone, irrespective of the number of years of previous study; and, further, that inasmuch as knowledge is equally valuable whenever and wherever obtained, this association indorses, *first*, the doctrine of demanding the highest standard of attainments compatible with the present onward march of dentistry, and on the part of applicants for a degree; and *second*, the most liberal spirit on the part of those granting diplomas as to the best manner in which said knowledge is obtained; that it is unjust and irrational on the part of any teacher to demand of a pupil the attendance on any prescribed and lengthy course of lectures, if it is proved satisfactorily that the requisite knowledge has been already attained; and that we believe, that in justice to a student of dentistry, as well as of any other study, the privilege of graduating *whenever pronounced fit*, is the true principle.

*"Resolved*, That as a means of facilitating the preparatory work of the student of dentistry, we recommend that no dentist shall take a student for less than two years, and that the failure on the part of such student to possess a good school education should be considered as a grave disqualification for the study of our profession."

## ALABAMA DENTAL ASSOCIATION.

THE annual meeting of the Alabama Dental Association was held in Selma, July 19, 20, and 21, 1881. Over one hundred dentists were present.

The following were elected officers for the ensuing year:

*President.*—G. M. Rousseau, Montgomery.

*First Vice-President.*—Wm. R. McWilliams, Athens.

*Second Vice-President.*—R. U. DuBois, Greensboro.

*Secretary.*—T. M. Allen, Eufaula.

*Treasurer.*—S. C. Wilkerson, Tuscaloosa.

The offices of corresponding and recording secretary were consolidated. The constitution and by-laws were revised, and made to conform to those of the the Southern and American Dental Associations.

The State Board of Examiners held their first annual meeting at the same time and place.

The following were elected as the Board of Examiners for the next two years: E. S. Chisholm, Tuscaloosa; Wm. R. McWilliams, Athens; T. M. Allen, Eufaula; W. D. Dunlap, Selma; and J. G. McAuley, Mobile.

The Board issued one hundred and thirty-seven permanent licenses under the new law.

The Association adjourned, to meet in Montgomery, on the second Tuesday in April, 1882.

T. M. ALLEN, *Secretary.*

## NEW HAMPSHIRE STATE DENTAL SOCIETY.

THE fifth annual meeting of the New Hampshire State Dental Society was held in Concord, June 22, 1881. The annual address was delivered by A. M. Dudley, D.D.S., of Salem, Mass.

The following are the officers elected for the ensuing year:

*President.*—Hiram Hill, Manchester.

*Vice-President.*—E. G. Cummings, Concord.

*Secretary.*—E. B. Davis, Concord.

*Treasurer.*—G. A. Young, Concord.

*Librarian.*—B. P. Merrill, Plymouth.

*Censors.*—Drs. D. W. Edgerly, William Jarvis, J. H. French, H. Hill, and E. B. Davis.

*Executive Council.*—Drs. G. A. Young, B. C. Russell, Hiram Hill, D. W. Edgerly, and C. W. Clement.

E. B. DAVIS, *Secretary.*

## NEBRASKA STATE DENTAL SOCIETY.

THE fifth annual meeting of the Nebraska State Dental Society will convene at Omaha, Monday, September 12, 1881, at 7.30 P.M., and continue in session three days.

W. F. ROSEMAN, *Recording Secretary.*

## FIFTH AND SIXTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

A SEMI-ANNUAL union meeting of the Fifth and Sixth District Dental Societies of the State of New York will be held in the court-house, Cortland, N. Y., on Thursday, October 6, 1881, commencing at 2 o'clock, P.M.

Members of other societies, and of the profession generally, are invited to attend and take part in the proceedings.

G. F. HORSEY, *Secretary Fifth District Society.*

A. J. WRIGHT, *Secretary Sixth District Society.*

## AMERICAN ACADEMY OF DENTAL SCIENCE.

THE fourteenth annual meeting of the American Academy of Dental Science will be held in Boston, Mass., on the last Wednesday in October (October 26), at 10 o'clock, A.M.

The annual address will be delivered by Dr. F. N. Seabury, of Providence, R. I.

JOHN T. CODMAN, *Recording Secretary.*

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EDITORIAL.

## DENTAL SECTION INTERNATIONAL MEDICAL CONGRESS.

As previously announced, we made arrangements for a report of the proceedings of the Section on Diseases of the Teeth, International Medical Congress, which held its session in London, August 2-9. The report has been received, and will appear in the October number.

## THE WISCONSIN DENTAL COLLEGE AND THE POST-OFFICE DEPARTMENT.

WE printed in our March number of this year specimens of the circulars issued by the Wisconsin Dental College. We are still getting copies of these circulars through the mail from dentists who have received them, and their letters to us express the general dis-



gust of the profession that such fraudulent practices as this institution proposes to them can be so unblushingly carried on.

The correspondence published below shows that the Postmaster-General is adopting such legal measures as he can to put a stop to this bogus diploma business. But unless there were to be found men weak enough to encourage the enterprise, there would be no necessity for official interference. It is the demand which creates the supply. So long as these circulars are sent out, so long will it be manifest that the fools are not all dead; for knavery fattens on folly.

DEPARTMENT OF THE INTERIOR, BUREAU OF EDUCATION,  
WASHINGTON, July 22, 1881.

TO THE EDITOR OF THE DENTAL COSMOS:

DEAR SIR:—The attention of this Office having been repeatedly called to the fraudulent practices of one Dr. Geo. Morrison of the dental college at Delavan, Wisconsin, which was noticed also in the DENTAL COSMOS of March, 1881, I took occasion early in July to call the attention of the Postmaster-General to the same, and I herewith inclose his reply which you may like to publish.

Very respectfully yours,

CHARLES WARREN, *Acting Commissioner.*

POST-OFFICE DEPARTMENT,  
WASHINGTON, D. C., July 13, 1881.

THE HONORABLE THE SECRETARY OF THE INTERIOR:

SIR:—I have the honor to acknowledge the receipt of your communication of the 11th instant referring to this Department a communication from the Commissioner of Education, inclosing letters, etc., showing the fraudulent character of business carried on by one Dr. George Morrison, President of Wisconsin Dental College, at Delavan, Wis.

In reply I have to state that I have this day issued an order to the Postmaster at Delavan, Wis., forbidding the payment of money orders or the delivery of registered letters to the said Dr. George Morrison.

Very respectfully,

THOMAS L. JAMES, *Postmaster-General.*

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## BIBLIOGRAPHICAL.

ANATOMICAL STUDIES UPON BRAINS OF CRIMINALS. By MORITZ BENEDIKT, Professor at Vienna. New York: Wm. Wood & Co., 1881.

The recognition of the proper relation between physical, mental, and moral conditions is one of the results of the development of modern biological science, which, by its discoveries and generalizations, has so simplified what was formerly considered not only abstruse but even beyond the limits of knowledge, that at the present day there is no such thing left as an isolated phenomenon in an entire scrutiny of human nature. The relations between the corporeal man and the spiritual man are so close that one cannot be disturbed in

ever so slight a degree without the occurrence of a corresponding disturbance in the other. Man is one, in the most absolute sense of the word. Touch his emotions, and his circulation is disturbed,—he grows pale or blushes. Check his circulation, and he ceases to think, or becomes an idiot or a lunatic. Interfere with his digestion and impair his secretions, and his aspirations flag, his hope droops; impair them still more, and he becomes a brute. Too much brain-work will cause his muscles to atrophy; too much muscular exercise will deaden thought. The prick of a lancet will convert him from a maniac or a senseless body into a rational being. The principle which these observations illustrate—the relation between physical and mental or moral conditions—derives perhaps its greatest practical importance from its application to the study of the causation of crime and to the question of individual responsibility. It is no longer believed that all persons are equally competent to resist temptations, and the injustice of the penal law, which estimates the degree of the crime and the amount and character of the punishment by the more or less accidental magnitude of the results of the criminal acts, is being forced upon public notice. The author of this treatise endeavors to show by the records of careful dissections upon numerous cases, that the brains of criminals exhibit a deviation from the normal type sufficient to constitute them as a class a true variety of the human species. To any one who realizes the closeness of the connection between mind and matter,—who has familiarized himself with the history of crime and its relations to various nervous diseases, there is nothing startling in this proposition, which, though it should not be accepted without abundant proof, is apparently entirely in accordance with the facts here recorded by Professor Benedikt. The brains of twenty-two criminals guilty of murder, theft, burglary, etc., showed an arrangement of convolutions and of fissures quite distinct from those recognized as normal, and closely allied to one another in their main features, thus forming a well-marked group. Observations of this character will doubtless be continued, and will be looked for with interest throughout the civilized world. If our penal system is ever to be anything but a series of retaliations by society upon the criminal, without reference to the cure of individual cases or the general prevention of crime, the improvement must come through this sort of scientific contribution to our knowledge of the subject.

**HYGIENE AND TREATMENT OF CATARRH.** By THOMAS F. RUMBOLD, M.D. St. Louis: George O. Rumbold & Co., 1881.

This is the second portion of a work the first volume of which was noticed in the DENTAL COSMOS for December, 1880. It is oc-

cupied chiefly with a description of the therapeutic and operative measures necessary in the treatment of chronic catarrhal inflammation of the nose, throat, and ears, much attention being paid, as in the previous volume, to the minutiae of the subject, and to the mode of life of the patient. The author seems to have had an extensive experience and to have conscientiously recorded the results of his practice. He believes that chronic inflammation of the nasal passages precedes all catarrhal diseases of the ears, eyes, and respiratory tract; that through nervous connection this inflammation gives rise to numerous troubles in associated parts; that all catarrhal mucous membranes should be treated mildly and with non-irritating remedies; that the spray-producer is the only instrument which should be used to make applications; that the majority of laryngeal troubles can be successfully treated by applying remedies to the pharyngo-nasal cavity alone; that hygienic measures are of paramount importance in the treatment of catarrh, etc. Much space is given to the minute description of instruments of the author's own invention and to the armamentarium of his office.

**THE COMPEND OF ANATOMY.** For use in the Dissecting Room, and in Preparing for Examination. By John B. Roberts, M.D. Philadelphia: C. B. Roberts, 1118 Arch Street, 1881. Second Edition, revised.

This little book has been enlarged to the extent of seven or eight pages by the addition of a table of ossific centers. Numerous typographical and other errors have been corrected and a few changes in language have been made; otherwise the book remains as at the time of our previous notice of it.

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## OBITUARY.

### DR. ENOS G. ROY.

THE committee of the New York Odontological Society, appointed to take action on the death of Dr. Enos G. Roy, have prepared the following:

The society learns with deep sorrow that our associate and fellow-member, Dr. Enos G. Roy, has been removed by death, and that, too, in the very prime of his manhood and usefulness in his profession.

His modest and unpretending manner; his kind disposition; his interest in and regular attendance at our meetings; his faithful discharge of the duties of Librarian, a position held by him for several years; and his general professional worth and excellence had endeared him to us; and, appreciating his many manly and Christian qualities, we shall sadly miss him from among us.

We would tender to his bereaved family in their affliction our kindly sympathies, assuring them that his memory will be ever dear to us.



## DR. S. C. WILSON.

DIED, at Bloomington, Ill., June 27, 1881, of heart disease, Dr. S. C. Wilson, aged forty years.

Dr. Wilson was widely known and respected. He had been in the dental profession for nearly twenty years, and his practice was one of the largest in Central Illinois. He was a prominent member of the Illinois State Dental Society, in which he had held several offices, at one time that of vice-president. His illness was of about four weeks' duration.

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PERISCOPE.

CANCNUM ORIS.—Dr. Cleveland reported a case of gangrene of the mouth (cancrum oris) that had occurred in his practice. It occurred in a little child, *æt.* two years. The child had been sick for some three months with chronic pneumonia and was apparently improving; the fever had subsided and the child seemed to be gaining strength, when a high fever set in, with great prostration. The little patient emaciated rapidly and became very feeble. Her bowels were very costive and stomach irritable; for this condition a purgative dose of calomel was given. In two days afterwards salivation was noticed, with puffing of the gums and lips, and loosening of the incisors above and below. Commencing with the gums of the incisor teeth the gangrene (for such it proved to be) rapidly extended. It attacked the end of the tongue, but showed no disposition to extend further, nor did it extend in the upper maxilla beyond the first region of attack (around the superior incisors). The superior incisor teeth fell out and the alveolus was exposed and black, but below the ravages were extensive, the incisor gums were destroyed and it extended over the lower lip by way of the mucous membrane, destroyed the lower lip in its entirety from the corners of the mouth, making a crescent sweep two-thirds of the way to the edge of the chin. Death ended the scene on the ninth day of the attack. The child was so debilitated, and it was so evident that it could not live, that heroic measures, like the actual cautery and nitric acid, were not considered; palliative measures alone were resorted to. As is usual in these cases, the disease appeared to progress without pain. Also as is always the case, the disease was secondary, the patient being broken down by a previous disease. The hygienic surroundings in this case were in every respect favorable. This is contrary to the rule, as it is a disease usually occurring in foundling hospitals and among the feeble and poor. Mercury was regarded as a possible exciting cause of the disease, but that this was what developed it was not looked upon as at all probable. Measles were present in the house at the time and the possibility of this being the exciting cause was suggested. Some English statistics go to show that measles precede quite a noticeable number of cases of gangrene.

*Discussion.*—Dr. Whittaker, in opening the discussion, remarked that the disease is of comparatively rare occurrence and is not infre-

quently overlooked. He had seen but one case and that was in the Cincinnati Hospital. The name covers many diseases, but as here understood means noma or gangrene of the mouth and is distinguished from aphthous, catarrhal or ulcerative stomatitis, by being attended with necrosis of tissue. What is the cause of it and why the face should be specially subject to this disease in young children is not known. It is never primary, but secondary to some infectious malady that is attended with coagulation of the blood. All authorities agree that measles is the primary malady in nine-tenths of all the cases. The black point speaks for loss of nutrition. The speaker did not believe that mercury, as frequently supposed, was a cause of cancrum oris. It is given in all sorts of affections as a laxative, and if it were the offending agent the disease in question ought to be of much more frequent occurrence. Ptyalism may be produced, but when the drug is checked at this time, there is no fear of noma. It is only when given for a long time in small doses frequently repeated that we might find a plausible explanation in attributing the disease to the use of mercury, but not when given for its laxative effect only. The child in the instance reported certainly had some infectious malady, probably a masked measles, but possibly of a pulmonary character, though the essayist did not state what it was. The disease did not depend on any external cause in the majority of cases, but came from within and depended upon an occlusion of a nutrient vessel causing gangrene. As regards treatment not much can be said; cauterization with nitric acid limits the spread of it and consequently ought to be practiced when the disease is seen early enough. During the war great praise was sung of bromine applied pure as the best caustic and antiseptic.

Dr. Tate, in answer to a question, replied that he never saw this disease as a result from the use of mercury. He saw two cases of noma in which the trouble commenced in the mucous membrane of the cheek and then followed the usual course. The case reported differed from the usual form, inasmuch as the mucous membrane adjoining the gums was the origin of the disease, an inflammatory affection characterized by profuse secretion seizing the cheek and then destroying not only the gums but proceeding inwards and causing necrosis of bone. This history, with the great prostration of the general system as in measles, in the great majority of instances, results from a depravity of the blood. But the question may be asked, If the patient in the case reported had had no mercury would he have had noma? Is it not possible that mercury was the exciting cause inducing this unfortunate result? The speaker could not prove from personal observation, but it seemed to him as if noma was not now so frequent as when calomel was freely used and salivation was more common. It was remarkable that in the case cited the hygienic surroundings were good; generally they are unfavorable; both of the speaker's cases were of a depraved constitution, one breathing in the foul air of a damp cellar, the other following after a long course of typhoid fever. The treatment consists in upholding the system and cauterizing the ulceration, preferably, in Dr. Tate's opinion, with strong nitric acid. There is no question, that although the disease is very fatal, a number of cases get well.

Dr. Nickles never had a case of gangrene of the mouth, but some

years ago was called to a coroner's inquest on a child, five years of age, to whom a quack had given calomel in excessive doses. The speaker, however, as well as another physician, concluded that it was not the calomel that caused the disease.

Dr. Drury said that he saw Dr. Cleveland's case in the last days. The doctor told him he had given calomel and thought that salivation might have caused the trouble. The mother or nurse first observed the condition of the mouth, beginning with a swelling, then the spot, etc. This process probably began in the mucous membrane of the mouth or the muscular tissue beneath. Measles is said to be a frequent cause of the disease, one author reporting thirty-six out of forty-eight, another forty-one of sixty-eight, cases of gangrene of the mouth and measles respectively. As regards treatment, English authorities recommend the use of strong nitric acid, applied with a pledget of lint and thoroughly rubbed in the gangrenous part.

Dr. Cleveland, in conclusion, stated that measles existed in the house in which he had his case, though the child had no eruption, if it had the disease. He was at a loss to account for what the pulmonary disease was; there was consolidation of the lower lung, tubular respiration, later emaciation and death. It may have been tuberculosis or chronic pneumonia. Convalescence had taken place before the relapse, which fired up the pulmonary symptoms. Treatment was out of the question, because death was inevitable. He would have cauterized with the hot iron or strong nitric acid if there had been any hope, but in this instance it would have been futile.—*Reports Academy of Medicine, in Cincinnati Lancet and Clinic.*

**INFLAMMATORY CONDITIONS OF THE VASCULAR TOOTH-STRUCTURES.**  
—Mr. Stocken read a paper on the value of certain remedies in the constitutional treatment of inflammatory conditions of the vascular tooth-structures, and of the neuralgia arising therefrom. The remedies to which he specially directed attention were chloride of ammonium, sulphide of calcium, and gelseminum. He had selected these, because their action was not so generally known as that of many other agents. He gave a full description of the therapeutic effects of these drugs, indicating the class of cases in which each would be likely to be most serviceable. His conclusion was that, in simple neuralgia of the fifth pair, gelseminum, with or without aconite, would effect a cure, or at least afford considerable relief. If the pain were due to congestion or inflammation of the pulp or pericementum, he would prescribe also chloride of ammonium; while in chronic periostitis, with suppuration, sulphide of calcium gave results which were in the highest degree satisfactory, cutting short the attacks in a most remarkable manner. He was of opinion that dental surgeons did not generally give sufficient attention to the constitutional treatment of the cases under their care. Mr. S. J. Hutchinson said he thought it was a mistake for dental surgeons to undertake constitutional treatment. If this appeared to be necessary, he should communicate with the patient's ordinary medical attendant, leaving the details of the treatment to him. Any other course would inevitably lead to strained relations between medical and dental practitioners. The president said it was difficult to define the exact border-line between medical and dental practice;



but he thought that, so long as there was any prospect of saving a tooth, the dental surgeon was justified in using any means at his disposal with this object. At all events, he thought that every dental practitioner ought to have a thorough knowledge of the value of constitutional remedies in dental practice; and in order to promote this, he should be glad to see a chair of pharmacology attached to every dental school.—*Reports Odontological Society of Great Britain, in British Medical Journal.*

**SYMPATHETIC PTOSIS FROM DECAYED TEETH.**—E. C., an unmarried woman, aged thirty-three, formerly a domestic servant, was admitted on December 5, 1880. She was the subject of marked ptosis in both eyes, the ciliary edges of the upper and lower lids being in complete and even apposition on both sides. There was no wrinkling of the skin or other sign of spasm of the outer portions of the orbiculares. She was quite unable to open her eyes, and when pressed to try to accomplish this there was usually marked spasm of the orbicularis oculi, together with contraction of the anterior bellies of the occipito-frontales muscles and horizontal wrinkling of the forehead. On opening the lids with the fingers, considerable orbicular spasm ensued; but when this resistance was overcome, the condition of the globe was found perfectly natural, its movements being more free, of normal extent, and visual acuity  $\frac{20}{20}$ . There was no sign of paralysis. The spasm of the orbicularis was most marked when the patient knew she was being observed, and when her attention was directed to it. She, however, complained of a "nipping" sensation coming on at irregular times, and referable to this spasm. This condition had only come on a fortnight before, but she stated that in 1879 the left eyelid was in the same condition, and got well in a short time. Her general health was good; catamenia regular, but painful. It was considered at first that this was a case of hysterical ptosis, and in support of this it was found that the patient did occasionally, when she thought herself unobserved, partially raise her upper lids. She was one day placed under the influence of chloroform, having been previously informed that on coming to herself she would find herself able to open her eyes. While under chloroform her eyes were bandaged. When she recovered consciousness she was assured that she was cured, and the bandages removed. On telling her to open her eyes she did so widely for a moment and then relapsed into her old condition. She was ordered shower-baths and tonics, and afterwards valerianate of zinc and assafoetida without any benefit. Her forehead and eyelids were then faradized for ten minutes every morning. This was continued for about ten days, and then abandoned because she refused to submit. The actual (benzene) cautery was applied momentarily to the superciliary eminences without effect. Strips of plaster were attached to her lids and forehead, and covered with collodion. This kept her lids open for a time, but the strapping becoming loose, the ptosis recurred, though to a trifling extent less than previously, for there was now a palpebral fissure of about one-sixteenth of an inch. Thinking the irritation of the stumps of numerous decayed teeth might be the cause of her complaint, Mr. Power ordered them to be extracted. This was accordingly done at two sittings, the

patient being under the influence of gas and ether. The ptosis thenceforward steadily diminished in both eyes, but to a most marked degree in the left. Ten days from the extraction of her stumps—nine in number—the palpebral fissure was wide enough to expose more than half her cornea, and she could see to read and to find her way about without any bending back of the head.—*St. Bartholomew's Hospital Reports in Lancet.*

**THE TREATMENT OF RANULA.**—An important discussion took place before the Société de Chirurgie on the treatment of ranula, in which nearly all the members took part. M. Deleus recited a case in which the cyst was excised and cauterized, but at the end of two months it returned. This fact, he believed, resulted from the migration of the sublingual ranula through the muscular fibers of the floor of the mouth, developing a cyst in the buccal cavity. M. Trelat for many years excised with the scissors in the case of small ranulæ, and where they were more voluminous he treated them by puncture and the injection of iodine. M. Després treated every kind of ranula by the drainage, and always with success. M. Verneuil observed that he tried many methods in the treatment of ranula, but with varied success. He adopted the plan of slow section, for which purpose he passed a curved needle charged with a double thread of silver wire through the cyst, and united both ends in a firm knot. In five or six days the section was effected. M. Labbé did not doubt the success obtained by M. Després by his method, but he considered that to keep a seton in the mouth for six months to cure a ranula constituted a veritable infirmity. M. Després, in replying, said that he never knew a patient to complain of it. M. le Dentu said that M. Auger employs the injection of two drops of chloride of zinc in the deliquescent state into the cyst without previously evacuating it. This treatment always succeeds; there follows a sharp inflammatory reaction, but it is by no means dangerous. The inflammation subsides in five or six days, and at the end of ten days the cure is complete. For small ranulæ one drop of the liquid suffices, and if the cyst is very voluminous it is preferable to draw off a little of the contents before introducing the chloride of zinc. M. Gillette could not agree with M. le Dentu in considering that chloride of zinc was not attended with danger and that it was always successful. He had seen M. Auger at the Hôpital Beaujon inject three drops, and the pain was so intense that the patient tried to jump out of the window; and, after all, the cyst returned and was eventually excised.—*Medical Press.*

**PAROTID ABSCESS CAUSED BY A FRAGMENT OF HAY.**—At the beginning of last October, a healthy young man consulted me about an enlargement of his right parotid gland. The swelling was not very tender, but caused very great discomfort in mastication. I prescribed what I considered suitable remedies, and saw him occasionally. Weeks passed away, but the swelling and discomfort did not diminish; and about Christmas, finding that he had two decayed and tender molar teeth I advised him to consult a dentist.

At the end of February my patient came back to me. He had had both his teeth extracted, but his parotid gland was bigger than

ever. The tumor had been formerly of the natural color of the skin, but it was now covered with an inflammatory blush, and seemed to point in one particular spot. A deep puncture was made with a sharp, narrow knife, and matter followed the incision. The wound continued to discharge for ten days, and at the end of that time a piece of hay, somewhat more than one-third of an inch long, escaped; the wound closed, and the swelling subsided. The patient was under treatment altogether just six months.

The explanation of the case now seems simple enough. In the early part of September, he went into the country for his holiday, and he distinctly remembered chewing some hay while he was watching a cow being drenched. A fragment of the hay became lodged between the gum and the cheek, but by working his jaw about, he thought he dislodged and swallowed it. For several days afterwards he had considerable pain in eating, but he attributed this to having sprained the muscles of the jaw in his efforts to dislodge his enemy. A month afterwards, the swelling of the parotid began. There can be no doubt, I think, that the little fragment of hay passed into Steno's duct when it was thought to have been swallowed, and gradually worked its way up to the salivary gland in front of the ear, where it ultimately made its escape.—*Edward E. Meeres, M.D., in British Medical Journal.*

**SQUAMOUS EPITHELIOMA OF THE UPPER JAW.**—Mr. Butlin showed a specimen of squamous epithelioma of the upper jaw, removed from a man sixty-two years old, admitted into St. Bartholomew's Hospital in November, 1880, for carbuncles on the back. In December, he complained of a sinus in the upper jaw, which had been discharging for some time before. On December 29, Mr. Willet explored this sinus, which opened into the alveolus of the second right molar tooth, and was thought to be due to carious bone. Exploration of the antrum through this sinus showed that cavity to be partly filled with pus and blood, and to be lined by soft granulation-like material. There was no swelling; but the condition of the antrum was thought to be suggestive of malignant disease. At the beginning of February, Mr. Butlin scraped out some of the contents of the antrum, and found in the scrapings altered epithelial cells and cell-nests. Accordingly, on February 8, he removed the whole of the maxilla, and found that the disease not only filled the antrum, but invaded the orbit and speno-maxillary fissure, and had made its way beneath the temporal muscle. Yet the only external indication was a slight puffy swelling, which had appeared beneath the orbit in January. The growth was a pure squamous epithelioma, and was remarkable for its insidious character, and widely-destructive course within a comparatively short space of time. It belonged to the class of maxillary new growth, called by Reclus "epitheliome terebrante" (*Progrès Médical*, 1876), and described by that writer as starting from the alveolar process. In each of Reclus's cases, the disease was first thought to be caries, and ran a rapid course. The disease probably starts from the alveolus of a tooth which has become carious, or from which the tooth has fallen out, and then spreads into the jaw, and does not start in the antrum, which is lined by cylindrical epithelium. It was not, therefore, necessary to trace its origin back, as Reclus does, to an



alveolar cyst, or to the remnant of the epithelial masses of the primitive tooth-sac. There was no affection of the glands or other internal organs in this case. The only other instance in English literature is one described by Mr. Lawson at the Clinical Society, in 1873, as a well-marked squamous epithelioma, which Mr. Hulke suggested as beginning in the alveolar process. Mr. Rushton Parker did not think this form of disease very rare.—*Pathological Society of London Reports, in Lancet.*

**A NEW DENTAL DISEASE.**—A child, aged ten, whose teeth six months ago appeared to be all perfectly sound, came to me with toothache in the right lower canine. I found that a large portion of the enamel had disappeared from the front surface of the tooth, as if it had been chipped violently off; the dentine was all exposed, but there was no softening or appearance of decay. The disease, which has commenced in several of the other incisor teeth, appears first as a small white spot in about the thickest part of the front surface of the enamel, which it seems to penetrate; and then, suddenly disintegrating, this comes away, and exposes the remaining sensitive enamel and the dentine. This disease is altogether a different thing from the gradual decay, or wear at the neck of the teeth, frequently met with in adults, for in this case the patient is only ten; and, as far as I have been able to ascertain, the incisors and canines never have been known to decay in the manner above described. We are often at our wits' end to cope with the increasing prevalence of caries in the teeth of the very young; and if this be (as I fear it is) a new form of destructive energy, the sooner it is recognized the better.—*N. Stevenson, M.R.C.S., in British Medical Journal.*

**NECROSIS OF THE MAXILLÆ.**—In concluding the report of a case of necrosis of the alveolar border of the lower maxilla with the incisor teeth, following ulcero-membranous stomatitis, Bouchut stated that the case would never have progressed to such a stage, had not the original malady, which was readily curable, been neglected. Necrosis of the jaw in children is proportionately a rare sequence of the above disease; among the many hundreds of cases occurring under his observation he had met with but fifteen such necroses.

Its origin is very simple. If a large portion of the gum which exerts the function of the periosteum be destroyed, the exposed bone dies and escapes as a sequestrum. These cases usually heal thoroughly and promptly. In one case in which considerable force was required for, and slight hemorrhage followed the removal of an apparently loose sequestrum, osteitis set in the next day, followed by pyæmia and death. He therefore warns his readers against too early a removal of sequestra. The author has found the best treatment for stomatitis to consist of frequent gargling with carbolic acid solutions (1.1000), and the internal administration of chloride of sodium.—*Cincinnati Lancet and Clinic.*

**RIGGS'S DISEASE.**—Mr. Hamilton Cartwright made some remarks on the treatment of Riggs's disease, referring to the destruction of the periosteum of the teeth, absorption of the alveoli, and ultimate loosening and loss of the teeth. He said that it generally

commenced in an unhealthy condition of the gums, and that he believed the deposit of tartar to be secondary to the disease; the deposits of the saliva pocketing between the separated gum and the teeth. Of course, the first and most important matter was to remove the tartar effectually, but he still held that much might be done by a very, so to speak, "heroic" treatment with the knife and escharotics used alternately.—*Proceedings of Association of Surgeons practicing Dental Surgery, in The Lancet.*

**ABNORMALITIES OF DENTITION.**—Mr. Edward Bartlett read a short paper on the four following cases:—*Case 1* was that of a girl aged twenty, with a supernumerary tooth posterior and between the central incisors, and which appeared at the same time as the centrals. *Case 2* was that of absence of the second bicuspid, which was accounted for by the posterior deciduous molar being forced up nearly into the antrum by the closure of the first bicuspid and molar over it. This (the crown of the molar) Mr. Bartlett removed, which felt on exploration like dead bone, being covered with tartar. *Case 3.* Two very large supernumerary teeth and lateral, which he had removed from the mouth of a man, aged thirty-three, who had a third central incisor, undistinguishable from the normal ones. *Case 4* occurred in a young lady, aged nineteen, in which all the permanent teeth were absent, with the exception of the two centrals, two canines, and two molars, some of the temporary teeth remaining in their position.

Mr. Cartwright showed a most remarkable case of the jaw of a dwarf, about three feet high, and compared the denture with that of the American midgets. The dwarf was the child of wealthy parents, and grew normally for some months, when the development of its body became completely arrested, whilst that of the head and brain continued to a great extent. The boy is about sixteen years of age and highly intelligent, having recently gained a prize for French at school, and having a great taste for study generally. He walks, however, with difficulty, his head being so much larger than his body. His teeth, unlike most dwarfs, are not deficient as in the case of the midgets, but consist of a perfectly formed *first* set. In the upper jaw only the first molars had been shed to give place to the bicuspid, which are nearly erupted, while the sixth-year molars are just appearing. In the upper jaw there is a perfect set of milk teeth, without any sign of caries. In conclusion, he wished to draw the attention of the Society to the analogy existing between the teeth and dermic structures in their development, and that, as a rule, both the hair and teeth were deficient in dwarfs; but that in this case the hair was as perfect as the teeth, the only peculiarity in the latter being the persistence of the first denture up to the age of sixteen years.—*Proceedings of Association of Surgeons practicing Dental Surgery, in The Lancet.*

## HINTS AND QUERIES.

"He that questioneth much shall learn much."—BACON.

CORRESPONDENTS desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

**TARTAR, AND SOME CAUSES OF AN EXCESS OF PHOSPHATE OF LIME IN THE CIRCULATION.**—Dr. Niles's admirable paper in your April number is a help not only to the dental profession, but to the general practitioner. It has been of special interest to me, as it has supplied some missing links in the chain of facts that throw light on that most obscure and still more important subject of Diathesis. I am sure he and dentists in general are situated in positions of great scientific value where they can throw much light on the antecedent history and progress of those slow chemico-vital changes that finally land a man in the hospital. They see him on the way to that break-down which is called disease, and at a stage when prevention (so much superior to cure) is still possible.

The causes of an excess of phosphates of lime and magnesia in the circulation are a little complicated. For blood is alkaline, and able to hold in solution only a small quantity of the earthy phosphates. Phosphates of lime and magnesia are known in chemistry as earthy phosphates; and those of potash, soda, and ammonia as alkaline phosphates. On the quantity and proportion in the blood of these two groups depends the chemistry of some diatheses. Now, food, as a rule, contains an abundance of earthy phosphates, most of which are not taken up by the system, on account of their insolubility, but pass out unchanged by the bowels. Therefore, any long and continuous excess of those phosphates in the secretions means either some peculiar state of the blood, admitting of their easier solubility, or some peculiar need of the system calling for more phosphates; both of which states may also co-exist. I do not here refer to such brief and sudden discharges of phosphates from the system as occur in some diseases, especially those of the nervous system, for such do not continue long enough to be a common cause of tartar.

Of the phosphates in the blood only a small portion are directly concerned in tissue-building; most serve (with the carbonates) as the chemical agents of digestion, assimilation, blood-making, and blood-purifying. Food abounding in nitrogen, carbon, and all the tissue-building elements, except phosphates, cannot nourish the body, and indeed will not long prove digestible.

Liebig, in his later days, was much impressed with the importance of the saline parts of food, but since his death no other great chemist has worked at the subject, and it has been rather overlooked. He showed that unless the alkalinity of the blood was maintained, the nutritive changes between it and the tissues could not go on. Between alkaline blood and acid tissues the mutual interchanges of nutrition and of waste are easy and rapid; but if this chemical antagonism is in any way lessened, the changes are slower, and the tissues must suffer.

Liebig pointed out that the carbonates and the phosphates of the blood were the salines mainly concerned in these changes, and this because of the ready facility with which they can part with one-half or one-third of their base, thus changing from alkaline to acid states, with comparatively slight chemical effort.



The phosphates of the alkalies almost alone are useful in this, being so readily soluble; the earthy phosphates exist in blood normally only to the extent of one-fifth the quantity of the alkaline phosphates; but it is highly probable that in alkaline-starvation of the body, earthy phosphates may be absorbed in excess to supply the need.

Scurvy being an acute form of alkaline-starvation (or rather of organic alkaline salts) offers many advantages for demonstration of the chemistry of such a condition; and the urine, rather than the blood, best illustrates the changes. The normal proportion of alkaline to earthy phosphates in the urine is four to one (Parkes); but in scurvy it may fall to four to three; a three-fold increase of earthy phosphates. Anti-scorbutic diet (vegetables, etc.) gradually restores the natural proportion, and this as much by *reduction of the earthy phosphates* as by increase of the alkaline. (Ralfe, *Lancet*, 16th June, 1877.)

Dr. Niles has remarked on the influence of hard water, and where the hardness is due to carbonate of lime (the commonest cause) the effect is undoubted. In our German experiments 450 grains daily of carbonate of lime entirely reversed the proportion of the phosphates in the urine. Here, then, is another cause of the excess of phosphates of lime and magnesia in the circulation.

The earthy phosphates are, as a rule, abundant in our food. The herbivora seem to absorb only one-ninth (Lawes and Gilberts), passing the rest undigested through the bowels. Their food is rich in alkaline salts of the organic acids, such as citrates, malates, etc., which are turned to carbonates in the system. Hence phosphates are less necessary to them. But the food of the carnivora is deficient in organic salts, and phosphates are retained for their chemical value. Thus, in the ash of the blood of the dog there is 36.5 of phosphoric acid, whereas that of the sheep and the ox averages 14.4. Man's blood is inferior in phosphoric acid to that of the dog, containing only 31.8; and in carbonates, on the other hand, it is 80 per cent. inferior to that of the herbivora.

There is thus great probability that the commonest cause of an excess of phosphate of lime in the circulation is a deficiency of alkaline phosphates and carbonates in the food. That our modern habits of diet and of cookery tend to this, a few illustrations will prove. White flour, the basis of our bread, biscuit, and many substantial dishes, contains about 75 per cent. less phosphates than the whole grain; and of these only about 8 per cent. are soluble; whereas, in bran 72 per cent. are soluble. In the diet of many, this one article alone is sufficient to account for blood-poverty, but there are too many others. Corned beef, pickled pork, bacon, ham, and salt fish have generally lost all of their soluble phosphates before they are placed upon the table. Corn starch, gelatine, and isinglass, all of which enter more largely into fashionable cookery than many are aware, have been almost, if not entirely, deprived of all alkaline salts. Canned fruits also have generally been so carefully washed before cooking, to improve their appearance, that they fail to improve our blood as they ought to.

Vegetables again, on which so many rely as anti-scorbutics, etc., are excluded from the modern hotel soups, so that most of the anti-scorbutic virtue goes down the kitchen sink, while we eat the much inferior and less digestible remains. Just imagine pouring the tea into the sink and eating the tea leaves; that is about our manner of using vegetables. That this alkaline-starvation is a common cause of debility, feebleness, and inability to react against disease is a growing conviction. Many recent pathological facts point in that direction. Foremost among these I may quote the fact that amyloid degeneration consists of a tissue deficient about 50 per cent. in the natural amount of alkaline phosphates. The

brain, too, in some cases of insanity, is often deficient in its natural salts to a much greater extent. This amyloid degeneration, though most marked in wasting diseases, is also not uncommon in the arterial coats of many who seem healthy. Its final tendency is to cause obliteration of the smaller arteries and capillaries, often resulting later in true fatty degeneration.

There are certain types, temperaments, habits, and trades more liable than others to suffer from this alkaline-saline starvation. Who and what these are, dentists are in a good position to discover.—M. D.

**REPAIR OF A FRACTURED INCISOR.**—Last May, Harry B., a lad of fifteen, received a blow in the mouth from a bat in the hands of a comrade, which fractured the right central incisor. About one hour afterward he came to my office with his father. Upon examination, it appeared that the line of fracture, starting about half way between the cutting-edge and the neck of the tooth, on the right approximal surface, extended diagonally across the labial and lingual surfaces to within a short distance of the free margin of the gum on the left approximal surface. The lower portion of the tooth, although movable, was still retained in position by the pulp.

An anesthetic was administered, the broken portion removed, and the pulp extracted. The broken portion did not exhibit any lines of fracture in itself, and the idea instantly presented itself to me of pivoting it in its original position. This was effected as follows: after the inflammation caused by the blow had been subdued and the canal filled, the little end of the pulp-cavity in the broken portion was enlarged and a platinum post firmly fixed therein with oxyphosphate. The cavity in the root being also enlarged and filled with soft oxyphosphate, the pivot was firmly carried to its original position, or nearly so—the extending of the surplus of the cement preventing the broken edges from quite meeting. The patient was then dismissed for a week. At the next appointment, a groove was cut around the tooth in the line of fracture with a fine, round bur, followed by an inverted cone. A gold filling was then inserted in this groove, and the operation was complete. On examining the tooth a few days ago, it appeared to be perfectly firm, and with little in color or appearance to distinguish it from its fellows beyond the narrow line of gold across its face.—S. R. W.

**A CAUTION ABOUT THE "NEW-MODE" HEATER.**—The writer has just met with an accident in the use of the "New-Mode" Heater, and, though the resulting damage was small, it might have been much greater. The explosion, which shattered the glass door, was caused by gas formed by the heating up of a celluloid blank, in consequence of my own negligence in not removing the cap or screw of the stem F (illustrated and explained in the cut accompanying the description of the apparatus). This stem F is the outlet for gas generated in the dry-box, and should always be kept open when using dry heat for any purpose, such as drying out a flask, closing a case with a celluloid blank in it, or vulcanizing by dry heat. When this outlet is kept open, steam or gas generated in the dry-box has a chance to pass out without interfering with the temperature, provided the door is put on tightly.

It is so essential that this outlet should be kept open, under such circumstances as I have named, that I shall not venture hereafter to use the heater without being sure, not only that the cap is off, but that the orifice is not obstructed by dirt. This is easily ascertained by always passing a wire through the stem before using the heater.—L.

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ORIGINAL COMMUNICATIONS.

SHOULD THE PRACTICE OF DENTISTRY TO BE REGULATED BY  
LEGISLATION?

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THE discussion of this question properly belongs, first, to the social scientist; and, second, to those who have made the science of government (if it may rightly be so called) a special study. Any attempt by a dentist to discuss it in a dental journal needs excuse. It will be found in the fact that in fourteen of the thirty-eight States of our Union legislation regulating the practice of dentistry has been accomplished, and attempted in several others; also, in the fact that among associated dentists the opinion is practically unanimous in favor of such legislation.

We are persuaded that in most instances conviction of the need of such legislation has preceded argument and examination. We propose in this necessarily brief paper to examine the question in a catholic spirit; not from the stand-point of dentists, but from one high enough to so generalize the view that dentists may appear to be just what they are, simply citizens of our Republic, enjoying the same rights and privileges and bearing the same responsibilities as the general mass; not standing in special need of protection for themselves, and not forming a class against which the public need to erect safeguards. "Equality of rights is the first of rights," said Charles Sumner. Let us take this truism as a sort of guide and proceed.

Fourteen State legislatures having answered affirmatively to our main question, it may be assumed that either the reasons and arguments for such legislation were very conclusive, or that the legislation proceeded upon insufficient or fallacious data, or from the lack of a clear perception of the proper function of legislation, coupled with the good-natured supineness of the average legislator, in the



presence of a petitionary constituency,—“the other side” indifferent and not heard from.

To need regulating, a thing must be supposed to be erratic, disorderly, not in conformity to nature or the operation of natural laws. Hence a law devised to regulate the practice of dentistry, inasmuch as it could not properly recite the nature or extent of the irregularities, must at least be supposed to furnish in itself, by implication, the evidence of the irregularity. The laws which we have examined all simply state in effect that on and after such a date it shall be unlawful for any person to practice dentistry in such and such a State for a fee or reward, without first having conformed to certain conditions which are supposed to be necessary to the well-being of the community. Without stating so, it is implied that certain dangers and evils are incident to, and grow out of, an unregulated practice of dentistry. It is likewise implied that government is paternal in its nature, and that therefore one of its functions is to guard the people, its wards, from *any* evil or danger that may menace their peace and well-being. This specific law can offer no other reason for its being, and on no other grounds may it impose penalties and restraints.

Two matters here claim consideration. First, properly regarded, is it one of the functions of legislation to regulate the practice of dentistry? Second, is the present status of dentistry such as to demand legislative interference—the right of such interference being conceded? The first question should be decided on the general principle underlying all governmental questions of like nature. The second will need less attention, and will be mainly disposed of in answering the first. Let us endeavor to point out this principle, and, if possible, so formulate it that we may readily refer to it for approval or rejection any proposed legislation looking to the regulation of like matter with the one under consideration. The question is asked, Shall we have more government? Shall we embrace within its restraints and regulations a vocation heretofore left free? Government not being essential, but incidental only, growing out of certain evanescent evils of society, it may be looked upon as a kind of necessary evil. For the wild beast, a cage; for the felon, a dungeon; for the drunkard, prohibition; for the slave, a master; for the weak-backed, stays; but none of these for the good, for those living in harmony with their environment. “Bar-risters, judges, juries, all the instruments of law, exist simply because knavery exists.” We have to decide what shall be considered as giving one portion of a community a *right* to say to another portion, “Thou shalt *not* do thus and so!” What shall justify me in saying to my neighbor, “*This* you may do, but on pain of the pen-

alties of a law of which I may demand the enforcement of my prohibition, *that thou shalt refrain from doing?*" The old question as to the rights of the individual, and, growing out of that, the rights of society or multiple units, is really our question. "Man is endowed by God with certain inalienable rights, among which are life, liberty, and the pursuit of happiness," is an oft-quoted aphorism. On what verity of human nature does it rest? Happiness being a right and an object of universal desire, how is it attained? Herbert Spencer defines happiness as "a gratified state of all the faculties." In order to produce happiness, the faculties must be exercised. Insufficient exercise, or total disuse of a faculty, results in unsatisfaction, while the result of undue exercise is fatigue or satiety. Complete happiness only results when a proper equilibrium of exercise and repose of all the faculties is maintained. An opportunity for unrestrained exercise of the faculties being a prerequisite to happiness, it follows that whatever tends to restrain or prevent such exercise to that extent reduces the sum-total of happiness. Complete happiness demands complete freedom of action. Suppose one man the sole inhabitant of the earth, and it is evident he need consult no one's wishes as to what he might do; he might do whatever he willed, subject only to the restraints of limited human power and his own necessities. But man being a social animal, certain of his faculties demand for their exercise and full satisfaction association with others of his kind, and it is in his relations to his fellows, to society, that we must consider him. In the chemical combination of one element with another, it has been shown that the affinity is between atom and atom. The strength of a bar of metal is the aggregate effect of an indefinite number of molecular adhesions. After the same manner every social phenomenon must have its origin in some property of the individual, and just as the attractions and affinities which are latent in separate atoms become visible when those atoms are approximated, so the forces that are dormant in the isolated man are rendered active by juxtaposition with his fellows; and if we would understand the laws and principles underlying and governing society and social phenomena, we must look for them in the human constitution, study the human atom, and thus we may, so to speak, be able to evolve the atomic theory of sociology.

Man's relations to his fellows, to society, necessitate restraint. Two men pursue in the chase the same animal; the possession of the same object seems necessary to their happiness alike. Here arises a necessity for adjustment. The law of might is the law of the unreasoning brute. But man, being a reasoning, moral animal, or distinguished from all others by the possession of a moral sense,

as most believe, cannot accept the rule of the law of force without violating that moral sense.

The moral sense originates in the needs which grow out of the relations between man and man. Our five physical senses grow out of and are designed to answer certain physical needs, and are as indispensable to an isolated man as to one in the social state. But the very existence of society implies some natural affinity in man for such a union; also, the existence of some faculty to guide him in it. Society meets certain needs of human nature which can be supplied in no other way, and "the principles of a code for the right ruling of man in society, or in a state of multitude, will be found in humanity in its state of unitude; the moral forces which are to govern man in the aggregate are to be found in the social atom—man."

The supply of certain bodily needs being indispensably necessary to its preservation, they are not left altogether to considerations of the advantages arising out of such supply. Were it so, it is hardly likely our bodies would be as well cared for as now. Did there exist merely an abstract idea that it was proper or necessary to maintain the population of the globe, it is more than likely that the trouble and expense incident to the care and rearing of offspring would more than counterbalance the weight of those abstract considerations. Many of the needs of the body and of the race—knowledge, liberty, reputation, property, etc.—are in like manner not entirely dependent on intellectual considerations for their supply. Indeed, the supply of some of the essentials of human existence and progress are secured not at the dictate of reason, but often in defiance of it. "Answering, then, to the action which it is necessary for us to perform, we find stimulating us thereto a desire; and the pleasure derived from the satisfaction of the desire is in proportion to the importance of the act. As the all-important requirements of our physical being are fulfilled at the importunity of desire, may we not reasonably suppose that the conduct necessary to our social and moral well-being will be prompted by like means? Honesty and fair dealing, and a consideration for the feelings and rights of others, being necessary to our happiness in a state of society, will find an answering desire to secure those ends. In other words, does it not point to the possession of a moral sense which shall dictate rectitude of conduct in our dealings with others; which shall derive gratification from such conduct, and give birth to a sentiment of justice?" The physical senses, unaided by reason, must often determine whether a contemplated act be right or wrong. In normal health, appetite is the sufficient guide as to the rightness or wrongness of taking food; and so of other physical



needs; and as we refer to our physical senses certain questions arising out of our physical needs for their decision, so must we refer moral questions to our moral sense.

The existence of this moral sense is neither so clearly nor so generally recognized as some might suppose. Indeed, the unthinking are hardly aware of its existence at all. Let us demonstrate its existence; and we shall do so by quoting verbatim from Herbert Spencer (as we also do in some other parts of this paper), as bringing out the matter into clearer relief than we may hope to.

“‘And so you think,’ says the patrician, ‘that the object of our rule should be the greatest happiness of the greatest number?’

“‘Such is our opinion,’ answers the petitioning plebeian.

“‘Well, now, let us see what your principle involves. Suppose men to be, as they very commonly are, at variance in their desires on some given point, and suppose that those forming the larger party will receive a certain amount of happiness *each* from the adoption of one course, whilst those forming the smaller will receive the same amount of happiness *each* from the adoption of an opposite course; then, if greatest happiness is to be our guide, it must follow, must it not, that the larger party ought to have their way?’

“‘Certainly.’

“‘That is to say, if you (the people) are a hundred, whilst we are ninety-nine, your happiness must be preferred should our wishes clash, and should the individual amounts of gratification at stake on the two sides be equal?’

“‘Exactly; our axiom involves that.’

“‘So, then, it seems that, as in such a case you decide between the two parties by numerical majority, you assume that the happiness of a member of the one party is equally important with that of a member of the other?’

“‘Of course.’

“‘Wherefore, if reduced to its simplest form, your doctrine turns out to be the assertion that all men have equal claims to happiness; or, applying it personally, that you have as good a right to happiness as I have?’

“‘No doubt, I have.’

“‘And pray, sir, who told you that you have as good a right to happiness as I have?’

“‘Who told me? I am sure of it; I know it; I feel it; I ——.’

“‘Nay, nay; that will not do. Give me your authority. Tell me who told you this; how you got at it; whence you derived it.’”

Whereupon, after some shuffling, our petitioner is forced to confess that he has no other authority but his own feeling; that he has

simply an innate perception of the fact; or, in other words, that his moral sense tells him so. The existence of such a sense will be apparent to any one upon only a superficial examination of the subject. The "It isn't fair," and "I have as good a right as you," of the child; the "It is none of your business," and "Hands off; don't meddle with my affairs," of the adult, reveal the workings of the faculty; while statesmen, philanthropists, and all who have ever fought against tyranny and oppression, have found in this sense the mainspring of their actions. Assuming, then, the existence in man of such a faculty as this for prompting him to right dealings with his fellows, and assuming that it generates certain intuitions respecting those dealings, it seems reasonable enough to seek in such intuitions the elements of a moral code. But we must not suppose such an instinct capable of deciding intuitively every ethical question submitted to it. The moral sense cannot supply the place of logic. Its office is to originate a moral axiom, from which we may develop logically a systematic morality. Our mathematical sense, if we may so term the sense which takes cognizance of measurable quantity, linear dimensions, the bulk of different bodies and their relations to each other, etc., cannot decide with scientific accuracy many questions involving a use of this faculty, unaided by reason, owing to the conflicting judgments it makes in different individuals.

But this sense makes us all agree on certain propositions, such as that things which are equal to the same thing are equal to each other; a whole is greater than its parts; a straight line gives the least distance between two given points, etc. And from these axioms, or fundamental truths, we may, with the aid of reason, deduce rules by which we may, with scientific accuracy, solve questions of the most complicated nature. The mechanical sense, unaided by reason, falls into such errors as supposing that water rises in a pump by suction; that perpetual motion is possible. The unaided sense of feeling leads to the error of believing iron or stone to be *per se* colder than cloth or wood. Likewise, we may expect to find a great conflict of opinion in respect to human rights and duties, resulting from an appeal to the unaided moral sense. Our only safe standard will be deductions scientifically drawn from axiomatic or primary truths which the moral sense recognizes. To such a standard we may refer, for approval or rejection, many intricate problems of human society.

We have seen that the pursuit of happiness is an inalienable right; have also seen that happiness consists in a satisfied state of all the faculties. That the faculties must be exercised in order to produce happiness, we have likewise seen. It follows, then,

that whatever restrains or prevents the free exercise of any of the faculties to that extent renders happiness incomplete. It thus becomes evident that all should enjoy the utmost freedom of action. But just here, since we are living in a state of society, arises the necessity for limitation; for, when two persons in the pursuit of their respective ends clash, the freedom of each is limited by the like freedom of the other. His movements are free only so far as they are not interfered with by the other. The state in which he is placed, then, not affording full opportunity or freedom of action, and the rights of each being the same, the restraints must be apportioned equally; wherefore we arrive at the general proposition, that every man may claim the fullest liberty to exercise his faculties compatible with the possession of like liberty by every other man. Freedom being the prerequisite to normal life in the individual, *equal freedom* becomes the prerequisite to normal life in society.

To state our first principle, then, concisely, that we may readily refer to it any proposed act of an individual or of collective individuals, and then proceed to its application to the particular case now under consideration, is what is left for us to do. First, premising that it will be admitted that no rights can inhere in society which do not inhere first in the individual; or, in other words, that what it is not right for one man to do cannot be right for two or more, we state the first principle thus: "Every man has freedom to do all that he wills, provided that he infringes not the equal freedom of any other man."

As will be seen, it has been our aim up to this point to indicate a general principle,—one founded on equity and rooted in intuitive convictions. If we have succeeded in this, we have a principle broad enough to embrace in its regulations many problems of sociology; and the process by which we may develop a system of equity from this first principle is sufficiently manifest. We have only to ascertain what acts range themselves within the domain of the *may*, and what must stand within the *may not*. We have only to consider of a proposed act of an individual or society, whether in its performance the permissible freedom of any man is trespassed upon; whether, when placed in the scale, an equipoise of *equal* freedom for all is maintained; and by thus drawing the line between the permissible and the forbidden, we may classify acts into right and wrong. In the light of our first principle, let us now see how those acts of fourteen of our sister States to regulate the practice of dentistry appear. Let us examine its workings in a supposed individual case.

A person, feeling himself possessed of faculties which, if exercised in the field of dental practice, will yield him greater returns of hap-



piness than if applied in any other direction, determines so to employ them; and, after qualifying himself in the manner which to him seems best, or, in other words, after preparing the commodity which he proposes to sell, with a due regard to the demands of trade and the cost of production, offers his commodity for sale in open market, and it may be, with a view to creating a demand for his wares, resorts to the usual methods of trade for such purposes, and has recourse to signs and newspaper advertisements, and possibly placards, displays of specimens of his handiwork, and circulars. He finds patrons who purchase, and as both parties to the transactions have been perfectly free, the result must be supposed to be from their stand-point mutually advantageous. Now appears on the scene a servant of the law, who, in all probability, having been informed by some interested person that this particular tradesman or practitioner is offering goods for sale which have not been fashioned after the law's prescribed method, proceeds to restrain him in the further exercise of his vocation, the restraint being enforced by the alternative of a fine or imprisonment. Now, judged by the law of *equal* freedom, which says every man has freedom to do all that he wills, provided he infringes not the like freedom of any other man, the proceeding is unwarrantable, and a violation of his personal rights. Not having broken any just law, no just law may presume to punish him. And in the supposed case, not only has the law violated the rights of the tradesman, but the rights of his patrons have been likewise invaded; their freedom has been curtailed; they are punished, not for violating the law of equal freedom, but for violating a law enacted in the interests of a class. We have seen the workings of the law—injustice, inequity, violation of natural rights—for, provided the goods or services offered and sold are what they are represented to be, no interference with either purchaser or seller is permissible; and, provided they are not as represented, the punishment of the seller lies in the loss of patronage, which, sooner or later, is sure to follow; or, in suffering of penalties imposed under laws against violation of contract, breach of trust, and the like. We shall see further on, also, that the loss and bodily harm (it may be) which the purchaser may sustain in the transaction is his punishment for ignorance, or the non-use of possessed knowledge; for the sins of ignorance, in the material world at least, are not winked at, whatever may be the case in the spiritual.

Now, let us look at the *intent* of the law, and examine its workings more closely. The law proceeds on the assumption that it is the duty of the State to adopt measures for promoting the health of its subjects. What, then, is the State? Primarily, men voluntarily associated for mutual protection. Now, when rightly ordered,

the condition on which this voluntary association offers its services must be such as to enable it to afford the greatest amount of protection possible. If otherwise—if it insists on non-essential conditions, which prevent some men from accepting its services, or on conditions which unnecessarily compromise the liberty of those men who *do* accept its services—it manifestly fails to that extent in performing its function. Now, the moment the State undertakes a second office, it does all this. Men leagued together for a special object will never unanimously agree in the pursuit of any other object. So long as our “Joint Stock Protection Society” confines itself to guaranteeing the rights of its members, it is pretty certain to be co-extensive with the nation; for, while such an organization is needed at all, most men will sacrifice something to secure its guardianship. But let an additional duty be assigned to it, and there will immediately arise more or less schism. The dissenting minority may, in such a case, consist of two parties, the one comprising those who have so great a repugnance to the contemplated arrangement as to resolve upon seceding rather than consent to it, and a larger party, consisting of those who grumble at the imposition of additional charges for the doing what they do not want to be done at all, but who think well to submit rather than give up the benefits of protection. Towards both of these parties the State fails in its duty. The one it drives away by disadvantageous terms, and from the other it exacts sacrifices beyond what are needful for the performance of its original function, and by so doing becomes an aggressor instead of a protector.

The association of the State being voluntary and for a specific purpose, viz., mutual protection, to diminish liberty by taxes and civil restraints for collateral purposes is not permissible, because adverse to, or at least not embraced in, its original function. To embark the “Joint Stock Protection Society” in any new enterprise would require a new compact, with unanimity of agreement, as in the first place. But the history of legislation is one continuous record of attempts on the part of the State to regulate matters outside its original jurisdiction, and with comparatively few exceptions those attempts have failed, and for the reason that it has been legislation in the interest of a class, and not of the whole community. Legislation has attempted to embrace in its regulation almost the whole range of domestic and social affairs. Among a very numerous list are these: The preparation of food; the cut and material of clothing, even to grave clothes; the hours of labor, and its remuneration; the places where commodities should be bought or sold; what vocations citizens should engage in, and what not; the hours at which the people should retire; the manner of cleaning their houses

and furniture; profanity, smoking, riding or walking, publishing and reading, etc. The record is interesting and amusing, and ought to be instructive, and to such as look upon legislation as a panacea for all the ills of the body politic, I would recommend some reading on the subject. But how are we to determine between what legislation shall attempt and what not? We need a scientific test by which we can determine in each case whether or not State superintendence is desirable.

Between the one extreme of entire non-interference, and the other extreme, in which every citizen is transformed into a grown-up baby, with bib and pap-spoon, there lie innumerable stopping-places, and he who would have the State do more than *protect* is required to say *where* he means to draw the line, and to give us substantial reasons why it must be just there and nowhere else.

It is evident that it does come within the proper sphere of government to suppress nuisances. To contaminate the air we breathe is to infringe the rights of our neighbors. Men having equal rights to the free use of the elements, having faculties which demand this free use for their exercise, and having that exercise more or less limited by whatever makes the elements more or less unusable, are obviously trespassed against by any one who unnecessarily vitiates the elements, and renders them detrimental to health, or disagreeable to the senses; and in the discharge of its function as protector, a government is obviously called upon to afford redress for those so trespassed against. Beyond this, however, it cannot lawfully go.

In this view it manifestly devolves upon those who asked for legislative interference with dental practice to show that, as now conducted without regulation, it constitutes a nuisance. That it is not this we need spend no time in discussing. It may even be doubted if in those States where individual freedom is unnecessarily interfered with under the regulations the practice is on any higher plane than in other States. Demand creates and regulates supply no less in *quality* than in quantity, and within the limits of the possible will the people get that quality of dental ability which they demand and are willing to pay for, without any extraneous helps in the way of legislation. And, furthermore, it is usually those people whose rights have been infringed to whom we look for demands for redress. Does the demand emanate from a class whose private interests are actually or fanciedly affected by an unrestricted practice? We shall not greatly err if we look upon the zeal manifested for the welfare of the ignorant, and the dear public, as but a thin disguise for promoting private interests at the expense of others.

If, by saying that it is the duty of the State to adopt measures



for protecting the health of its subjects, it is meant (as it *is* meant by the majority of those who ask for legislative regulation of either dental or medical practice), that the State should interpose between quacks and those who patronize them; that, to guard people against empirical treatment, the State should forbid all unlicensed people from practicing; then the reply is that to do so is directly to violate the moral law.

Men's rights are infringed by these as much as by all other trade interferences. The invalid is at liberty to buy medicines and advice from whomsoever he pleases; the unlicensed practitioner is at liberty to sell these to whomsoever will buy. On no pretext whatsoever can a barrier be set up between them without the law of equal freedom being broken. Moreover, this doctrine that it is the duty of the State to protect the health of its subjects cannot be established, for the same reason that its kindred doctrines cannot, namely, the impossibility of saying how far the alleged duty shall be carried out.

Health depends on the fulfillment of numerous conditions. It can be *protected* only by insuring that fulfillment; if, therefore, it is the duty of the State to protect the health of its subjects, it is its duty to see that all the conditions of health are fulfilled by them. Shall this duty be consistently discharged? If so, the legislature must enact a national dietary; prescribe so many meals a day for each individual; fix the quantity and quality of food for both men and women; state the proportions of fluid, when to be taken, and of what kind; specify the amount of exercise and define its character; describe the clothing to be worn; determine the hours of sleep, allowing for the difference of age and sex; and so on, with other particulars necessary to a complete and perfect synopsis, for the daily guidance of the nation. And to enforce these regulations, it must employ a sufficiency of duly-qualified officials, empowered to direct every one's domestic arrangements. If, on the other hand, a universal supervision of private conduct is not meant, then there comes the question, Where, between this and no supervision at all, lies the boundary up to which supervision is a duty? To which no answer can be given.

Between committing the physical health of the citizen to the guardianship of the government and committing to it their moral and spiritual health, there is a most manifest analogy. The two proceedings are equally reasonable, may be defended by like arguments, and must stand or fall together. He who thinks the State commissioned to administer physical remedies may consistently think that it should administer spiritual ones also. Between a State medicine and physician and a state religion and clergy there is but one

step. "But it is said that ignorant persons cannot distinguish bad treatment from good, or skillful advisers from unskillful ones; hence, it is needful that the choice should be made for them."

Inconvenience, suffering, and death are the penalties attached by nature to ignorance as well as to incompetence; are, also, the means of remedying these. And whoso thinks he can mend matters by disassociating ignorance and its penalties, lays claim to more than divine benevolence. If there seems harshness in that ordination of things which visits a slip of the foot with a broken limb; which sends lingering agonies to follow the inadvertent swallowing of a noxious herb; which goes on quietly, age after age, giving fevers and agues to dwellers in marshes, and which now and then sweeps away by pestilence "tens of thousands" of unhealthy livers,—if there seems harshness in such ordination, be sure it is apparent only, and *not* real. Partly by weeding out those of lowest development, and partly by subjecting those who remain to the never-ceasing discipline of experience, nature secures the growth of a race, who shall both understand the conditions of existence and be able to act up to them. It is impossible in any degree to suspend this discipline by stepping in between ignorance and its consequences without, to a corresponding degree, suspending the progress. If to be ignorant were as safe as to be wise, no one would become wise. And all measures which tend to put ignorance on a par with wisdom inevitably check the growth of wisdom. Legislative acts to save silly people from the evil which putting faith in empirics may entail upon them do this, and are therefore bad. Unpitied as it looks, it is best to let the foolish man suffer the penalty of his foolishness—for the pain, he must bear it as best he can; for the experience, he must treasure it up, and act more rationally in the future. To others as well as himself will his case be a warning. And by multiplication of such warnings, there cannot fail to be generated in all men a caution corresponding to the danger to be shunned. And are there any who desire to facilitate the process? Let them *dispel error*; and, provided they do this in a legitimate way, the faster they do it the better. But to guard ignorant men against the evils of their ignorance; to divorce a cause and consequence which nature has joined together; to render needless the intellect put into us for our guidance; to unhinge what is, in fact, the very mechanism of existence, must necessarily entail nothing but disaster.

## CARIES OF THE TEETH.

BY JOHN D. CLARK, D.D.S., NEWBERN, N. C.

(Read before the Southern Dental Association and North Carolina State Dental Association in joint session, at Asheville, N. C.)

CARIES of the teeth, although a misnomer, is the disintegration or breaking down of their structure—a disease familiar to every dentist, and yet how little it is understood is shown by every effort to stop its ravages or to prevent its occurrence at times proving futile. It is admitted that dental caries results from chemical action. There are constitutional causes, producing badly-organized, defective teeth, and originating destructive agents, which act on them. We must bear in mind that the teeth are living organs, and physiologically not subject to spontaneous decomposition or disintegration. To understand this pathological deterioration we must, first, knowing the composition of the teeth, learn the character of the destructive agent or agents.

Analyses of the teeth vary according as those examined are well or poorly calcified; or as they are those of old or young subjects. Approximately, enamel is composed of four parts of organic and ninety-six parts of inorganic matter; the dentine, of twenty-five parts of the former and seventy-five parts of the latter. The inorganic portion is composed principally of phosphate of lime, with carbonates of lime and magnesium, chloride of sodium, etc., and the organic, like other parts of the body, is made up of albumen, casein, and fibrin, which are subject to the same chemical reactions here as elsewhere in the system. We would naturally infer from the composition of the teeth, that the destructive agents would be acids. Caries almost invariably attacks, first, the approximal and buccal surfaces and the sulci of the teeth, because at these points they are least exposed to friction; consequently, here food is allowed to remain, which, decomposing, generates acids.

Chemical action is always definite. No two acids, uniting with the same base, will produce like compounds. In other words, the compound or salt formed by an acid with a base or alkali is distinguished by chemical characteristics peculiar to itself from all other salts. The compounds thus produced are always definite—the result of established laws. As it is admitted that dental caries is the result of the chemical action of acid on the teeth, we naturally ask, Is it the result of one or more than one acid? Are there varieties of dental caries?

Let us notice some of the characteristics presented by this disintegrating process known as caries. The phenomena presented by caries are few in number. The profession recognizes only three; or,



if we include chemical abrasion, four kinds of caries. The "white decay," so familiar to us and so destructive in its work, advances more rapidly than the other varieties. The chemical reagent at work here not only acts on the inorganic material of the teeth, but also on the organic. In the second, or "brown" variety, the inorganic matter seems to be acted on only, and the organic substance remains as a coating to the cavity. In the third variety, or "black decay," the destructive agent acts less rapidly than in either of the others, seeming to form insoluble compounds with both the mineral and animal matter of the teeth. When chemical abrasion attacks the teeth, they are entirely destroyed as far as the disease extends; the destructive agent seeming to form soluble compounds with both the organic and inorganic matters. Now, since the phenomena of caries are few, and chemical compounds are always definite, must not the inference be that the reagents which produce dental caries are also few? If one acid produced different kinds of caries, or if two or more acids could unite with the same base to form salts of the same composition, then chemical compounds would not be definite; but since it is a law of chemistry that compounds are definite, we have no other conclusion than that stated above, namely, that each variety of caries is produced by a single agent.

The action of acids on the teeth depends on the degree of their concentration, and on the physical characteristics of the teeth. An acid unites with that substance for which it has the strongest affinity. The softer the tooth, the more rapid is its action, as the acid is brought into more immediate contact with the component parts of the tooth than when its structure is dense. Acid medicines and acid foods may and undoubtedly do at times seriously injure the teeth, predisposing to caries by roughening and pitting them, and destroying the polish necessary for their preservation; yet these causes are not to be charged with the production of disastrous results so distinct from each other in their chemical characteristics as are the different varieties of caries under consideration. The reagent must be sought for in the secretions of the mouth, and in the products of the decomposition of food.

The limits of this paper will not permit a minute consideration of the secretions of the mouth, yet we may hurriedly glance at their composition, and the probable part which they play in the destruction of the teeth. Normal saliva is a limpid fluid, with a slight degree of viscosity and an alkaline reaction. It is composed of water and a small quantity of solid matter, as albumen, fat, ptyalin, sulpho-cyanogen, and spirit and water extracts. The salts usually found in the saliva are phosphates, lactates, carbonates, chlorides, and traces of sulphates. Abnormal saliva has an acid reaction;

and the acids usually present are lactic, acetic, hydrochloric, oxalic, uric, etc. Mucus is obtained in such small quantity, and is so variable as a result of any irritation of the membranes, that it is difficult to characterize. However, we know that it contains extractive matter, alkaline lactates, chlorides of sodium and potassium, and a small quantity of fat. It also contains a peculiar nitrogenous principle called mucin. There is a secretion of the gums about which but little is known. Some attribute to it an alkaline reaction, while others state that it is decidedly acid. The saliva, as it is found in the mouth, is a mixture of the above secretions, and is seldom found to be normally alkaline. In tests of the saliva, or mixed secretions of the mouth, of a hundred or two children and adults, the reaction in nearly every instance was decidedly acid.

Let us now briefly consider one or two acids which do act on the teeth, producing results similar to those of caries. Nitric acid, which is composed of one equivalent of nitrogen and three of oxygen, acts with energy on the teeth. It dissolves the phosphate of lime and decomposes the carbonate, thus setting free carbonic acid and forming nitrate of lime. The organic portion is entirely destroyed, and a very softened condition is produced, resembling "white decay." It is very likely that this acid is the active agent in the production of this variety of caries. Nitric acid unites readily with the bases; and, in the presence of weaker acids, it takes these bases from them. Although nitrogen and oxygen manifest little affinity for each other, they unite to form five different compounds. We are told that their tendency is to unite in the proportions to form nitric acid; and all that is necessary for these changes is air or moisture. So that, when one of these compounds of nitrogen and oxygen is formed, it is eventually converted into nitric acid by the oxygen of the water or air, both of which are always present in the mouth. We must not be led to suppose that nitric acid is the result of the union of the oxygen of the air or water with the nitrogen which is liberated by the decomposition of the mucus, and particles of nitrogenous food, which are allowed to remain about and between the teeth. Hydrogen is always present, as well as nitrogen and oxygen, in the decomposition of organized nitrogenous substances. The mutual affinities of hydrogen and nitrogen take precedence, thus forming ammonia. Now, ammonia, when exposed to oxygen, decomposes, and an oxide of nitrogen is formed, which is finally converted into nitric acid.

The second and only other acid which I will mention is sulphuric. I know that it is claimed by many that this acid does not injure the teeth, even when they are frequently bathed in a strong solution of it. Why it does not has never been explained; and it seems

strange that an acid like this one, which has a strong affinity for alkaline bases, when brought in contact with the teeth, should remain inactive. It has been proved by recent experiments that sulphuric acid does act on living bone. The teeth have a very similar composition to that of bone, differing from it in containing less organic matter, and in being denser and firmer. Why should it not affect the teeth? Sulphuric acid, having a strong affinity for alkaline bases, does not act directly on the phosphate of lime in the teeth, because it is not a neutral, but a sub-phosphate, and is neither soluble in this acid nor decomposed by it; but the other simple inorganic ingredients of the teeth are, and by their slow removal the teeth are broken down. The affinity of sulphuric acid for water is so energetic that it often forsakes favorite combinations to unite with it. In this way carbonization of the organic constituents of the teeth is produced. If this acid is found in the mouth, how is it formed there? Sulphur, when it unites with oxygen, has a tendency to form sulphuric acid. But is sulphur present in the mouth? We know that it is united with albumen, and that albumen is a constituent of mucus, and is found in many kinds of food. It is probable, however, that it originates in an indirect manner. Hydrosulphuric acid, or sulphuretted hydrogen, is a product of the decomposition of albuminous substances. That it is found in the mouth, and that it is exceedingly offensive, you will not dispute. The oxygen of the air decomposes this acid by uniting with its hydrogen to form water. The sulphur, thus liberated, being in the nascent state, has its affinities increased in energy, and unites with oxygen to form sulphurous acid, which, in presence of the water of the saliva, is converted into sulphuric acid. Having seen that the action of this acid is slow, and that it produces carbonization of the organic portion of the teeth, (phenomena which characterize "black decay,") shall we deny it all power in the production of this variety of caries?

To sum up what has been said, we offer the following propositions:

1. Caries of the teeth is due to the chemical action of acids.
2. Chemical action is always definite.
3. The teeth are composed principally of alkaline bases.
4. Acids, which have a strong affinity for these alkaline bases, are found in the saliva.
5. The compounds formed by acids with bases are always definite.
6. The varieties of caries are few.
7. The chemical characteristics of caries are similar to those produced by the action of certain acids which are contained in the saliva.



"CREDIT TO WHOM CREDIT IS DUE."

BY J. FOSTER FLAGG, D.D.S., PHILADELPHIA, PA.

WHEN great truths are promulgated, and the acceptance of them secured, it becomes a matter of much moment that the credit of the work should be justly accorded.

It is not for the sake of those who do these things that this is of moment, for the *doing* is ample reward,—and yet it is none the less their just due,—but it is for the sake of the great principle of truth, for a component part of which they have labored.

During the entire progress of the development of dentistry, there has, probably, been no other enunciation which, in all its bearings, is of equal importance with that of the *teaching that, under certain circumstances, "decay" should be left in cavities prepared for filling, and that the filling should be inserted thereupon.*

It is not alone the fact that this practice is of incalculable value in its comfort-giving and its tooth-saving aspect, but it is of equal import that its enforcement marked the first great triumph of so-called "heresy" over established views.

Until this achievement, every effort for reform or even modification of that which was regarded as regular practice, had been, *apparently*, successfully defeated: the attempt to introduce amalgam had resulted in the utter defeat of its advocates; the attempt to introduce arsenic had covered its suggester with obloquy, and it struggled in secrecy for years before its use was admitted to the ranks of "teachings," and, even then, it was so taught as to be almost as much a curse as a blessing.

Such changes as had occurred in practice had been gradual, and each gradation had been subjected to severe and proper scrutiny, but no great, fundamental rooting-up of error had ever been tolerated.

In the DENTAL COSMOS of November, 1875, p. 564, I am upon record thus: "It was then, with no ordinary temerity, that Prof. Robert Arthur first promulgated the teaching that this was a subject open for controversy, and intimated his conviction that the thorough removal of decay was not a *thorough performance of the duty of an intelligent dentist.*"

In the speech which I made before the New York Odontological Society, November 20, 1877, reported in the *Dental and Oral Science Magazine*, February, 1878, p. 4, I am upon record thus: "Twenty-two years ago, my very good and highly-esteemed friend, Prof. Robert Arthur, enunciated his belief in leaving decay in the cavities of teeth and filling over it, and it was stigmatized as nasty, dirty, slouchy work," etc., and I also referred to the action of the

faculty of the Philadelphia College of Dental Surgery in its attempt to silence Prof. Arthur, and prevent him from *teaching* "false doctrine."

I did not refer to the "twenty-two years ago" as the period when Prof. Arthur *first* enunciated his views, nor did I say that no one had ever enunciated such views before, but I desired to direct attention to the *comparatively recent* date of *solid opposition* on the part of *authority* to the views of that enunciation, and to *that enunciator* who had *fought for the enunciation until he had compelled its discussion, its trial, and its acceptance.*

It was at this meeting that Dr. W. H. Dwinelle, of New York, first stated an incorrect understanding of my remarks, was corrected by the president (Dr. Northrop), and then presented his claim to *precedence of enunciation* of these views, and referred to his article in the *American Journal of Dental Science*, September, 1846.

I did not deem that occasion the proper one for any consideration of such claim, though, immediately upon my return to Philadelphia, letters passed between Prof. Arthur and myself in relation to it, for, knowing the circumstances, we thought it, to say the least, strange.

Nothing more was said of this, and other matters, of more pressing moment, occupied the time and thoughts of both of us, until in the DENTAL COSMOS, March, 1879, I again asserted in reference to the accepted dental idea of "thoroughness," that "The first steady and unremitting attack upon this peculiar view of 'thoroughness' was that made by Prof. Robert Arthur in enunciating, and fearlessly and *successfully* promulgating as a 'principle,' that '*thoroughness*,' at times, and under certain conditions, *could only be attained* by *leaving* a portion of decayed dentine untouched in the cavity, and filling thereupon."

On June 22, 1880, Prof. Robert Arthur died.

At a meeting of the New York Odontological Society, held March, 1881, during a discussion upon recalcification of dentine, Dr. Dwinelle again spoke of his early association with this subject, and promised to bring to the next meeting the volumes of the *American Journal of Dental Science* containing the articles which he had contributed in this direction.

In fulfillment of this promise, Dr. Dwinelle brought the records to the April, 1881, meeting of the society, and is reported as having said: "The question was, whether dentine was capable of being recalcified. It was argued that it was possible and practicable, although it was supposed to be of recent recognition, and I took occasion to refer to the fact that many years ago I had related my experience in that direction in corroboration of the idea. I stated then and there that it was in the early part of the forties. I see

by the file of the *American Journal of Dental Science*, that it was in 1846 that I wrote an article on the subject, referring, I think, to cases and treatment in 1842 and 1843. We shall find this to be the case before we get through."

By reference to the article, we find the heading to be

*"Dissertation on Preparation of a Cavity in a Tooth, Preparatory to Plugging.* By W. H. DWINELLE. Read before the American Society of Dental Surgeons, at its Seventh Annual Meeting, held in the City of New York, August 4, 1846."

*Mr. President and Gentlemen:*

I am aware that I am about to propose a course of practice to you, wholly at variance with the present system, and which, at first, may perhaps meet with your unqualified disapprobation, and notwithstanding the gentle admonition which so naturally comes up of "Let him that thinketh he standeth take heed, etc.," still I feel so fortified by experience and observation in the position I am about to take, that I unshrinkingly press forward to its declaration."

The next position taken in the paper is, that it has always been deemed indispensable to remove every particle of decayed and discolored matter prior to filling, but that there are circumstances under which "to proceed and remove every particle of decay from the tooth would be to uncover the nerve," which practice is condemned. Under such conditions it is stated that, having prepared the cavity without interfering with the nerve, it is washed out with a solution of soda, and the tooth is then filled in the usual manner, "taking care, however, especially if the parts are much softened immediately over the nerve, to skillfully build an arch over that point, so as to enable it to resist the severe pressure of filling, finishing, etc."

The author goes on to say: "Here, then, we have actual decay sealed up within the center of the tooth, and that, too, in immediate contact with the nerve!"—the admiration mark is his.

Further on he says: "I have practiced in the manner above described for the last four years, and I do not now recollect of a single instance of failure;" and this is the only paragraph which can, in any way, be said to refer to "cases and treatment in 1842 and 1843."

Next he mentions a tooth of his own, "filled and treated as above by Dr. Westcott," nearly three years before, and from which he had never experienced the least inconvenience; but it was upon this very tooth that he was wrecked—going utterly to pieces!

It happened that this Dr. Westcott was, in those days, a champion in the camp of the Philistines, and his professional height was at least "six cubits and a span," and he was indignant in the extreme at this coupling of his name with such abominable practice. It was no "gentle admonition" which came from him, but a "correction"



in true gigantic fashion; for in the second issue after (*American Journal of Dental Science*, March, 1847) we find the following:

"CORRECTION.—The American Society appoints several members from year to year to prepare essays to be read at the next annual meeting, and these papers, whether they are read or not, have generally been published *as read* before the society. In the first number of Vol. VII., "A Dissertation on the Preparation of a Cavity in a Tooth, Preparatory to Plugging," by W. H. DWINELLE, is published as having been read before the society. This paper was not *read*, and of course, did not come before the society or its members till after it was published.

Our name having been connected with a peculiar practice advocated by the author, we have many times, since its appearance in the *Journal*, been asked whether the practice spoken of by Dr. D. was our practice under similar circumstances, or whether we would remove all soft bone, if by so doing we should probably expose the nerve of the tooth. There is evidently some misunderstanding upon this subject. If Dr. D. means, by his description, bone which is actually *decomposed*, as constituting the only covering of the nerve, I most unhesitatingly demur to his position, either in regard to its admissibility, or to being made authority in his, or in any other case, for such a practice."

Prof. Westcott—he was Professor of Operative and Mechanical Dentistry in the Baltimore Dental College at that time—also said that if a portion of dentine had been deprived of its lime, and was allowed to remain, and a plug which would exclude moisture should be made upon it, it would "undoubtedly give rise to trouble," as it would *contract* by drying, as would any other piece of cartilage. He concluded his editorial remarks by formulating several "essentials" in connection with the filling of a tooth, the first of which was,—"*That every particle of decomposed bone should be removed, and especially if it is in the immediate vicinity of the nerve.*"

Thanks to Prof. Arthur, we should, at the present day, regard this fulmination as anything but terrific, but it was not so in those days, and, therefore, when Dr. Dwinelle read it, he became, as did Saul and all Israel, "dismayed and greatly afraid!" and in the very next issue—June, 1847—he published an article to which he has never directed any attention, and which is, in fact, his *second* article, and which he did not think it worth while to read to the members of the New York Odontological Society.

This begins with the assertion that there "seems to be some misunderstanding" in regard to his September article, and he says of it:

"The article was somewhat hastily written, or I should not have fallen into the error of using terms so inexplicit and capable of such various construction, without the safe-guard of further qualification.

"The term decay is susceptible of so many significations, that even in ordinary usage it is exceedingly ambiguous; out of this circumstance the misapprehension seems to have arisen.

"I did not intend to be understood as advocating the propriety of leaving *actual* decay or *decomposed* matter in the cavity of the tooth; I mean in the strict sense of the term. But I *did* mean to be understood to say that there are circum-

stances wherein it is proper, and even *duty*—rather than do worse—to leave discolored matter in the cavity of the tooth, and even those parts of the tooth which have lost a portion of its lime, and with it a degree of its density."

Dr. D. next combats the idea of the "drying" of the cartilaginous portion which he has proposed to leave, but concludes this paragraph with the following position :

"The parts have lost a small portion of its lime and have assumed a modified character of original bone ; enough has been lost to render the change discernible, and yet they are sufficiently dense and firm to resist the force of a proper plugging."

This was the end of the controversy, and the record of Dr. Dwinelle was left thus :

SEPTEMBER, 1846.

"I feel so fortified by experience and observation in the position I am about to take, that I unshrinkingly press forward to its declaration."

"I wash out the cavity with a solution of soda, and then proceed to fill the tooth in the usual manner, taking care, however, especially if the parts are much softened immediately over the nerve, to skillfully build an arch over that point, so as to enable it to resist the severe pressure of filling, finishing, etc."

"Here, then, we have actual decay sealed up within the center of the tooth, and that, too, in immediate contact with the nerve!"

JUNE, 1847.

"The article was somewhat hastily written, or I should not have fallen into the error of using terms so inexplicit and capable of such various construction, without the safe-guard of further qualification."

"The parts have lost a small portion of its lime, and have assumed a modified character of original bone ; enough has been lost to render the change discernible, and yet they are sufficiently dense and firm to resist the force of a proper plugging."

"I did not intend to be understood as advocating the propriety of leaving actual decay or decomposed matter in the tooth ; I mean in the strict sense of the term."

It was regarded, from that time, that *the field was again open* ; that the opponents to this "heresy" had gained the day, and that it was "disreputable" to leave decay in a cavity and fill thereupon.

Prof. Arthur worked on—having commenced his experiments at the same time, or a year or so earlier, than Dr. Dwinelle—and, having gained the matured experience of ten years, he published his paper upon this practice in the *American Journal of Dental Science*, October, 1851.

In this he made his memorable enunciation: "I do affirm, with confidence, that a series of observations, running through a practice of ten years, have convinced me that in a vast majority of cases caries of the teeth remains stationary, if the opening of the cavity of decay is well prepared, and the cavity so filled as to exclude everything from it, although decayed, dead, and decomposed bone be left in it."

• The clear, incisive presentation of this subject by Prof. Arthur,

was such as to excite respectful attention from quite a number of his professional brethren, and while it must be said that no "material support" was given him, it was nevertheless quite evident that an impression had been made upon the dental mind.

Six months after this enunciation by Prof. Arthur we find Dr. Dwinelle again in print, "indorsing anew" the principle laid down in his "*communication to the Journal of 1846*," and ignoring completely his *less hastily written* communication of 1847.

Dr. Dwinelle's version of this matter is given, as reported in the DENTAL COSMOS, August, 1881, thus: "Years afterwards, our worthy and lamented friend, Dr. Arthur, in a series of articles in the same journal, advocated the same practice, being unaware, I have no doubt, that an article had been written by me upon the same subject some ten years previous."

"He was too dear a friend for me to wish to wound his feelings in any way, directly or indirectly, so I resorted to an expedient for taking the wind out of his sails without his being sensible of it."

As to the first of these positions, Prof. Arthur most certainly was not aware that Dr. D. had written any article upon this subject "some ten years previous," for it was just *five* years only since his first article had appeared. Of this *he was aware*, and he was well aware, also, of the *second* article, in which Dr. D. had so manifestly modified his views that there was practically *nothing in common between them*. And as for the second of these positions, what *can* we say of it? A professional man resorting to an "expedient" to take the wind out of the professional sails of a brother, in such a manner as that he would not be sensible of it; and that brother "too dear a friend" to permit that his feelings should be in any way wounded!

From that time to the present the name of Prof. Arthur alone has held connection with this great innovation on "old school" dentistry. From that time to this, no other attempt has been made to take any wind from those glorious sails which have so triumphantly weathered the storm!

At first the statement of Prof. Arthur was treated with contemptuous silence. He had made war single-handed, and in this wise, alone, he continued his demonstrations. At last the schism began to grow; personal animosity was enlisted against him, and, not *one* professor—as in the case of Dr. Dwinelle—but *four*, comprising the entire remaining members of the faculty of what was then the leading dental college of the world, were arrayed against him.

It was no magazine "correction" which was brought to bear to crush *him*, but a formal charge of "false teaching" was made, and,



he was required to defend his position before the trustees of his institution.

It was found impossible to move him from his grand, outspoken position; he had been no "hastily" prepared work; he had never said that which he was not *able* and *determined* to sustain "till the last armed foe expired;" his convictions were sincere, as was his whole nature; his fortress was impregnable; and so he gathered about him, one by one, the growing men of his profession; and so he taught till opposition fled before him as "the morn chaseth the night;" until, at last, *his* proposition, bold, square, and exhaustive, is accepted, and taught as one of the "truths" of dentistry, and for all time humanity must bless the name of Robert Arthur.

## PROCEEDINGS OF DENTAL SOCIETIES.

### AMERICAN DENTAL ASSOCIATION—TWENTY-FIRST ANNUAL SESSION.

#### SECOND DAY.—*Afternoon Session.*

THE president's address was referred to the sections on education and etiology.

Dr. D. C. McNaughton, chairman of the Committee on Dental Directory, reported that within the year lists had been received of the dentists in Mississippi, Connecticut, Tennessee, Missouri, and Minnesota; also, revisions of several lists. The report also suggested as likely to increase the value of the work that the names of colleges, and the addresses of the deans; the names of dental societies, and the addresses of their officers: the names of journals, and the addresses of their editors; and the names and addresses of dealers in dental goods, be added to the lists. It also submitted resolutions that the lists of the various States be exchanged direct, without passing through the hands of the chairman of the committee, fixing the price, where lists are sold, at one cent per name, and giving the chairman power to declare and fill vacancies in the committee.

The report was received, and, on motion of Dr. Barrett, the whole subject was laid on the table.

Section IV., Operative Dentistry, was passed; and Section V., Anatomy, Physiology, Histology, Microscopy, and Etiology, was taken up.

Dr. W. C. Barrett, chairman, announced that Drs. Niles, Bödecker, and Davenport would read papers, and Drs. Abbott and Barrett would speak on subjects embraced in the section.

Dr. E. S. Niles, Boston, read a paper on "Reflex Action and Shock in the Dental Specialty," of which the following is an abstract:

After stating the growing interest in the subject of the part played by reflex action in physiological and pathological phenomena, and noting the general paucity of authoritative information to be found in the text-books, or to be obtained from the teachings of the schools, the essayist defined reflex action as a term to be applied commonly in connection with a generation of nerve-force independent of the will. In the physiological point of view the generation of nerve-force is derived from four sources: First, the will, the highest form of nerve-force. Second, the higher reflex centers, embracing the whole cerebral spinal axis. Muscular movement, after the head is severed from the trunk, is independent of sensation and volition, and therefore purely reflex. Reflex movements, stimulated from the cerebro-spinal axis, are so intimately associated with the will as to be not readily distinguished from voluntary motion. Thus, the man who fluently addresses an audience is employed with the thought of his subject, while the muscles of speech and articulation are presided over for the most part by lower centers. Those movements which may be either reflex or voluntary are mainly governed by nerve-centers situated in the cerebro-spinal axis. Lower in the scale of nervous action we have the third source of nerve-force, what may be called the purely reflex system, commonly known as the sympathetic. Its office is to preside over the functions of circulation, secretion, excretion, growth, and repair. It is not yet conclusively proved that there exists a system of nerves called by Marshall Hall excitator-nutrient, and excitator-secretory, or trophic nerves, which directly preside over the nutrition of a part. Still lower in the scale of animal life is found the fourth source of nerve-force—automatic action—which has more or less local influence over the organ in which it is situated. While the four sources of nerve-force named are, in some respects, independent of each other, their fibers are so intimately associated with each other that it is hardly possible to stimulate one to excess without exciting some of the others. In view of the intimate association of the parts of the oral cavity with the cerebro-spinal centers, the practical conclusions are obvious in connection with our specialty.

Considering the question of shock in dental practice, the essayist contended for the utmost gentleness in the treatment of patients, arguing from the fact as stated that no one would doubt that there is a degree of exhaustion on the part of the patient after nearly every operation, varying according to susceptibility, time occupied, and amount of pain endured. In his opinion, the sight of our best cast-iron chairs, various smells about the office, the dental engine, with heavy hand-piece,—precluding delicacy of touch,—engine or electric pluggers, with their accompaniments, etc., were to be reck-

oned as sources of this exhaustion or shock. The more delicate and flexible the excavator or instrument, the more gentle will be its contact when we touch a tooth. "Cold steel" imparts a disagreeable sensation in proportion to the amount of metal in the instrument. He therefore believed the old way of making excavators and pluggers with wooden handles was more in keeping with the gentle and kind treatment which patients should receive.

Dr. C. F. W. Bödecker, New York, read a paper on "The Present Status of Dental Histology," in which he sketched briefly the history of the cell doctrine from its promulgation by Schwann, in 1839, giving an account of the modifications proposed by Virchow, Max Schultze, Beale and others, down to 1872, at which time the accepted theory of histology was as follows: The animal body is composed of minute cells, which are built up by a structureless, mostly nucleated protoplasm; the cells being either suspended in a liquid (the plasma of blood, lymph, saliva, etc.) or inclosed in a jelly-like intercellular substance; direct communication between the cells existing only in the myxomatous tissue; the muscles and nerves being regarded as derivatives of the cells.

In 1873 Carl Heitzmann established a new theory, which has been named the "bioplason" doctrine. The bioplason doctrine considers the animal body not as a mere agglomeration of individual cells, but as one continuous mass of living matter, having closed spaces more or less occupied by liquids (the blood, lymph, etc.).

Heitzmann discovered a reticular structure in the protoplasm, and described the nucleus, the granules, the uniting threads, and the inclosing layer, as the living matter proper, which is alone endowed with the capacity of motion and growth. The liquid held within the meshes of the reticulum he declared devoid of life. According to this theory the elementary form of living matter is a homogeneous, apparently structureless granule, of which hundreds may sometimes be seen in the small lump of protoplasm formerly denominated a cell. Heitzmann further discovered that all the tissues of the body, and the formerly so-called cells, are connected with each other, either directly by broader offshoots, or indirectly by a delicate reticulum of the living matter, traversing the basis-substance. Isolated lumps of protoplasm are not met with, except in the liquids of the body, as blood, lymph, etc., which are not regarded as tissues. The presence of the reticular structure in protoplasm is now accepted by most of the leading histologists of the day.

Applying the bioplason doctrine to the teeth, the essayist claimed that by no other theory can the various stages of an inflammatory process, such as caries is now recognized to be, be more clearly de-



scribed, and stated his conviction that as long as the old cell doctrine is adhered to the various physiological and pathological changes of the dental tissues cannot be realized. He also recapitulated the results of his own studies of the dental tissues under the direction of Prof. Heitzmann, which are in full harmony with the bioplaxson doctrine.

Cementum is identical in structure with bone, containing protoplasmic bodies within the lacunæ, offshoots of living matter in the canaliculi, and an extremely minute reticulum traversing the basis-substance. The canaliculi of the dentine, as a rule, are bifurcated only on the boundaries toward the enamel and cementum. Each canaliculus contains a central, slightly-beaded fiber of living protoplasm, which is set with delicate conical thorns. The basis-substance is pierced by a delicate reticulum which connects all the dentinal canaliculi indirectly with each other, and which evidently contains living matter. In the enamel are seen fibers of living matter like those of the dentine, except that they are smaller. These lie in the interstices between the enamel rods, and upon their periphery the same thorn-like projections are seen. The enamel rods themselves show an extremely delicate net-work. In the pulp all protoplasmic bodies, of the periphery as well as those imbedded in the myxomatous basis-substance, are united with each other, either directly by larger offshoots, or indirectly by filaments through the basis-substance. Thus it will be seen that all formations of living matter, of the dentine, enamel, and cementum, and of the pulp, are uninterruptedly connected with each other; then by the surrounding pericementum with the bony socket, and thence with the whole body. Hence, a tooth is composed of a series of wonderfully complicated living tissues, being a constituent part of the animal body, and is neither a compound lump of isolated cells nor a dead mass of lime-salts.

Dr. Frank Abbott, New York, stated that four years previously Dr. Bödecker and he had taken it upon themselves to investigate the minute anatomy of the teeth in health and in disease. Dr. Bödecker taking the structure of the tooth as his division of the subject, while to the speaker was allotted the study of dental caries. The results of their researches were published in the DENTAL COSMOS. [To assist in elucidating his remarks the speaker used a number of very greatly enlarged colored drawings.] As we all know, a tooth consists of dentine, enamel, and cementum, and the pulp. You will observe a direct connection between the pulp and the tissues outside the tooth. The protoplasmic bodies are in direct connection with the living reticulum in the dentine and the cement, and also with the periosteum.

Figure 1 is an illustration of caries of enamel. All the living matter in every direction is connected, so that whenever one part is affected all of the tooth is more or less affected, because the life extends everywhere. He did not think his statement would be contradicted that decay always begins with the dissolving out of the lime-salts of the enamel by the chemical action of some acid. Every tooth in a normal condition is free from decay, and it will not decay so long as it is kept in a state of perfect cleanliness. The enamel of the tooth is composed of  $96\frac{1}{2}$  parts of inorganic (principally lime-salts) and  $3\frac{1}{2}$  parts of organic matter. The illustration looks as though, while the continuity of the boundary was preserved, pieces of the surface had dropped in, having lost their supports. At the bottom the structure is nearly normal, only a little of the lime-salts being dissolved out; higher up it is more granular, and a step further and we come to the cavity of decay. We have here a return of the enamel to medullary or indifferent tissue. As soon as the lime-salts begin to be dissolved out, an inflammatory reaction is set up which reduces the tissue to its original condition. As it progresses from the surface, we find the whole structure broken down, little by little, through the enamel to the dentine and possibly to the ultimate destruction of the tooth, unless its course is checked. Decay occurs either as chronic or acute. In chronic decay we have a different condition from that which characterizes the acute form. His observations showed that decay assumes an acute or a chronic form, according to the perfect or imperfect calcification of the tooth. When the periphery of dentine is but little changed, and a narrow zone of yellowish color forms the boundary toward irregular shallow excavations, sometimes with various-shaped elongations passing down into the dentine, it is called chronic caries, because of the slow course it runs. Low vegetable organisms are never seen in the substance of a decayed tooth. They may accompany it, but not as an exciting cause. If the pulp be dead there is no reparation. The acids go on to the destruction of the tooth, assisted only by putrefaction of its organic portion. Meat decaying gives as one of the products lactic acid, which is an active agent in the destruction of tooth-substance.

In acute caries we have deeper elongations into the substance of the dentine, mainly in the shape of fissures running independent of the direction of the dentinal canaliculi,—frequently across them. Sometimes these fissures seem completely isolated, but the probabilities are that they are connected in some way with the mass of decay. Sometimes the connection is by means of tracts of partially broken-down dentine. Viewed with a low power, say 250 diameters, the fissures seem to be filled with a granular mass, the remains of

the former tissue. With a power of 1000 diameters we find that at a certain distance from the cavity the dentinal canaliculi look unchanged, and each contains the central transverse section of the dentinal fiber with its delicate offshoots. Approaching the cavity, the canaliculi become enlarged, and are filled with yellow protoplasm, in which is seen the net-like arrangement of the living matter. Still nearer the cavity the canaliculi are enlarged to many times their original size, sometimes several running together, forming a confluent cavity, and the basis-substance entirely disappears, and only indifferently formed protoplasmic bodies are visible. If a cavity in which acute caries has been at work is properly sealed up, recalcification will occur, but the dentine will be of a widely different character from the original formation. The meaning of the enlarged canaliculi was that the lime-salts had been melted down by inflammation. If the inflammation which produced it were taken away, probably recalcification would take place.

In caries of cement we have exhibited, first all the phenomena known to be present in the early stages of inflammation of bone. Cement is almost identical with bone, having the same structure. If cement were subjected to the same conditions as enamel and dentine, its decay would be much more rapid, as evidence of which we all know how soon we have little holes all around the necks of teeth after recession of the gum, and food debris lodges and ferments there. Decay in cement is in its essential features analogous to caries of dentine when in a live condition; in other words, it is an inflammatory process. On the boundaries of the caries we see, besides unchanged cement corpuscles, those which have been enlarged and transformed into medullary or inflammatory elements.

Down to 1831, I believe it was, all writers spoke of decay of the teeth as inflammation. Magitot, in 1868, stated that it is due altogether to a chemical process. Leber and Rottenstein claim that the leptothrix crawl into the canaliculi and enlarge them, so that the destructive agency can follow. He (Dr. Abbott) never saw such a thing as vegetable organism assisting the progress of decay. Even Tomes states that the process is simply a dissolving out of the lime-salts, treating the tooth the same as Magitot.

Dr. T. H. Chandler, Boston. Has Dr. Abbott followed Leber and Rottenstein's method of staining specimens?

Dr. Abbott. No, sir. The method used in preparing dentine and cement was slow decalcification, by means of a one per cent. solution of chromic acid; at least two months should be required to prepare the superficial layers of the tooth for cutting with a razor. To prepare enamel, the method first practiced by Dr. Bödecker was employed—splitting perfectly fresh teeth, by means of a saw, into their



lamellæ, grinding these down to the necessary thinness under water, and immersing the thin slices for partial decalcification in a one-half per cent. solution of chromic acid.

Dr. E. S. Niles. Did I understand that the inflammation of the tooth-substance was caused by the pulp. If so, how do you account for decay in a dead tooth?

Dr. Abbott. No; it is an outside influence. Decay in a dead tooth is assisted undoubtedly by the decomposition of the organic matter of the tooth-structure.

Dr. I. B. Davenport, Williamstown, Mass., read a paper on the "Etiology of Chemical Abrasion of the Cutting Edges of the Front Teeth."

Dr. Davenport said sometimes the upper and lower teeth are affected by abrasion, which leaves an elliptical space corresponding to the labial commissure when the mouth is opened as in ordinary conversation. Harris inclines to the view that acidulated mucus is the cause, secreted by a gland in the tip of the tongue claimed to have been discovered. Good authorities deny the existence of this gland. If Harris's supposition is correct, abrasion ought always to affect the lower as much as the upper teeth, which is not often the case, and the lingual and palatal surfaces should be most acted upon.

In 1875, a man of twenty-nine years of age, robust, with teeth of excellent quality, and no decay in any of those of the upper jaw, although some of the lower molars had been lost, presented. The superior centrals were worn away half their length; the laterals were affected to a less extent, and the canines very little; the other teeth were not affected. The patient had been a farm laborer, with perfect teeth; eight years before he presented he had gone to work in a nitric acid factory, where the escape of gases set his teeth "on edge," and at the end of six months, during which time the abraded surfaces were sensitive to the touch, heat, and cold, the result seen was produced. Dr. Davenport mentioned other cases of a similar nature. In all that he had seen or investigated there had been exposure to the fumes of nitric acid alone, or of nitric acid and oil of vitriol. Prof. Chas. Mayr says that the fact that any acid will produce such results is well known to chemists, who habitually keep their mouths closed during experiments with such agents, and suggests that those exposed to acid atmospheres keep the lips dry, as the vapor will condense on moist lips, and being thence brought in contact with the incisors and canines, will produce the same effects as when the fumes are inhaled.

From the foregoing facts Dr. Davenport inclined to the opinion that the cause of chemical abrasion of the cutting-edges of front teeth is direct contact with the teeth by inhalation of any volatile acid, mineral or organic, which is capable of dissolving the lime-salts.

Adjourned.

## NATIONAL DENTAL ASSOCIATION, UNITED STATES OF AMERICA.

President, Dr. John B. Rich, in the chair.

Dr. J. B. Patrick, Charleston, S. C., read a paper entitled "Singular Exhibition of Interstitial Growth in Teeth," descriptive of a case which had occurred in his practice. The history, as narrated, was as follows:

Some years since Mr. J. B., a well-known merchant of Charleston, had the left superior central incisor filled with gold directly upon its anterior surface, a little beneath the neck. About three years afterwards he called attention to the fact that the filling, while still firm in its place, had, to use his own expression, "grown down upon the surface," receding from the gum, and being therefore more visible whenever the lip was raised in smiling or in speech. He was informed that a tooth could not grow, but as the doctor had no precise recollection of the original position of the filling, and believed the patient was mistaken, a diagrammatic outline of the tooth was made, and the actual position of the filling at that time was carefully indicated, and the patient was requested to call again in the course of time. At a subsequent examination, some years later, Dr. Patrick was surprised to find that there had been an obvious change in the position of the filling to a point about a line below that indicated and accurately fixed by admeasurement in the drawing; and singular to state, there was no wearing away or attrition of the free border or cutting-edge of the tooth. It proved to be a real and not an apparent alteration of position. A fact so clearly established and yet so difficult to explain could not but arrest attention. The necessary inference was that should the process continue, the filling would ultimately come to occupy the absolute edge of the tooth and grow out of it altogether. That event really took place, as the progression continued, until the gold fell out, and no trace of the operation remained, except a slight indentation along the cutting-edge of the tooth.

Another case of a somewhat similar nature had been communicated to Dr. Patrick's son. The patient was the daughter of a prominent officer of the navy, by whom the following statement of the case was made:

"When my daughter was about eleven years of age she had a front tooth filled by Dr. Northall, a partner of Dr. Foster, of New York City; the filling was of gold, and close up to the gum. In the course of ten or twelve years the tooth had grown down until the filling was on the edge of the tooth."

In attempting to account for these anomalies, Dr. Patrick said that, were human dentine highly organized—traversed by blood-

vessels, nerves, and lymphatics—molecular depositions of new dentine would at once not only explain, but would actually foreshadow what might naturally ensue where a metallic substance like gold was imbedded in the tissue. Though organic in its origin, dentine in the human subject is not organized; therefore, it neither grows, inflames, nor undergoes repair; and whether burned, bored, broken, or filed away is never reproduced. The researches of Prof. Owen have demonstrated that dentine presents itself in the various classes of mammals in four distinct modifications, to which he has applied the terms unvascular dentine, vaso-dentine, vitreo-dentine, and osteo-dentine. The first only is supposed to exist in man. To what extent human dentine may become abnormally modified within perfectly healthy conditions, we know literally nothing. Theoretically there is no reason why modifications of structure may not be found reproduced in the human species, especially such as we know to obtain at an early period of the saccular stage of development. Why, for example, under very extraordinary and peculiar circumstances, may not some few of the capillary tracts of the formative vascular pulp remain uncalcified, perpetuating in the subsequent permanent tooth the embryonal stage of a vaso-dentine tissue? Under such a condition, molecular changes of an interstitial nature would constitute a very slow growth, similar in kind, though very different in degree, to that which is well known to occur in the incisors of rodentia; with this difference, again, that in the rodent the tooth grows as a whole from the base, whereas, in the case theoretically suggested, a segregated tract of interstitial molecules would alone undergo growth, and the progressive displacement of a foreign body would continue to advance until this was entirely expelled. Again, at a very early period of its evolution the crown, as well as the roots of a tooth, is surrounded by a thin layer of cement—*crusta petrosa*—the part of all others which most resembles bone in structure. It is possible that should such a layer of cement continue *abnormally* to invest the crown in any appreciable quantity, the presence in the layer of a foreign particle of gold might excite a somewhat active reproduction of the tissue in its neighborhood, which would, in like manner, produce the phenomenon mentioned.

In reply to a question as to the condition of the tooth after the filling passed off, Dr. Patrick stated that behind the filling the track which it followed looked somewhat like a crack.

Dr. Frank Abbott could not see how it was possible that such a thing could occur. Enamel does not change its position or its structure, after it is once formed, except to become more perfect in its solidity from a better deposition of lime-salts. It must wear



off at the end of the tooth in order to produce a change in the position of a filling, in his opinion. The pushing back of the gum, by brushing, or by any irritation, might give the appearance of such a change.

Dr. J. R. Walker had a case in one of his children, a boy now fourteen years old, which presented a similar appearance to that described by Dr. Patrick. When the child was nine months old he noticed a yellow, softened spot in the labial surface of the left upper central, indicating the speedy destruction of the tooth. At eleven months he inserted an amalgam filling, as the tooth was too soft for gold. At four years, while there had been some wear of the cutting-edge, there was an appearance as though the filling had moved. He thinks that to the superficial observer the natural wear from attrition and the recession of the gums might cause such an appearance.

Dr. Abbott. The tooth is as much organic in its composition as a bone or a muscle, and is composed in its basis-substance of the same material—connective-tissue—but the filling matter differs in the amount of lime-salts contained. We can get repair of a tooth just the same as of any other tissue, if we only know just what to do to cause it. We are all the time experimenting to find out what will cause it. Sometimes we get this repair accidentally. We get it sometimes under a gold filling. We get it where a tooth is ground off by attrition—the surface of the dentine becomes hard and polished. We get it by deposition of the lime-salts in the pulp-canal, until, if a man were to live long enough, the whole canal would be filled up; but there would still be a little life in the canaliculi, permeating the whole structure of the tooth. In secondary dentine, or where the deposits are made under extraordinary circumstances, as excessive irritation, we have a stronger deposition, and the canaliculi do not have their usual peculiar wavy appearance, and are not so numerous, so that the dentine so formed is denser than the ordinary dentine. So far as the organic structure of the tooth is concerned, he believed that was admitted. The pain caused by cutting the dentine is the result of injury to the living matter. This is more noticeable at the neck of a tooth; because there we find the greatest amount of life, we get consequently the most pain. He had seen many cases of secondary dentine, but never a case where a filling was dislodged by the growth of a tooth. He had seen cases where the filling dropped out from wear of the tooth at the edges, and in a few mouths the constant brushing causes the gum to recede, giving the appearance noted, but he cannot understand how Dr. Patrick's case occurred. The living matter runs through the tooth, permeates it in every possible way, the same as

it permeates the hand or any other part of the body; the hand was composed partly of living matter and partly of inorganic, or non-living. The cell theory is pretty well exploded, in his opinion, and it is now conceded by the best histologists, the world over, that Carl Heitzmann has established the fact that there is a connection between the masses of living matter, which pervades every portion of our bodies.

Dr. T. L. Buckingham, Philadelphia, asked Dr. Abbott if the dentine of a tooth which had been broken could reunite. In the college museum there is a specimen in which a tooth was broken and reunited. If this can be, there must be a healing process going on between the parts. In the case presented he cannot see how it is possible for the enamel to push down the filling unless the tooth is worn at the end. The circulation in the dentine goes through it in every direction, and in that process the lime-salts are deposited. If you put it into hydrochloric acid, you take out the mineral constituents and leave it nearly like cartilage. According to Beale, there are two forms in organized matter—formed material and germinal matter. Formed material has not the power to produce tissue; that is the province of germinal matter. We all know that, when the enamel is worn off, the surface of the dentine which is exposed is as hard as the enamel. Twenty years ago the same dentine might have been cut, and it would have been found quite soft, comparatively. Now, the question is, can the lime-salts be re-deposited in such a way as to fill a cavity. Such an event would happen in bone: why not in tooth?

Dr. Odell. Dr. Abbott says some parts of the body have no life; and then, again, that all parts are pervaded by the living matter, which is a contradiction in terms.

Dr. Abbott, replying to Dr. Odell, said we know that there is no life in lime-salts, because it is inorganic. If we took even a section of nerve we could not say it was all alive; a certain portion would be alive and a certain portion not. It would be impossible to touch any portion of the hand with a needle-point without touching the living matter. Certain parts of the structure have one function; other parts have other offices. Take the amœbæ, for instance, looked at with a high power, the network of living matter will be seen, filled with water or some fluid, but there is no life in the fluid. That is the condition in any protoplasmic body before the materials are properly disposed for the performance of function.

Dr. Buckingham. This question of life is one of the most difficult with which we have to deal. He cannot agree that some portions have life and some have not. To say that a portion of the structure is dead, and yet performs functions, is strange. He

doubted that lime-salts have no part in life. You cannot destroy a portion of muscle, or blood, or bone, without destroying a portion of this which you call inorganic material. Sensation is carried by the nerves just as electricity is carried by the wires. He had no doubt that sensation is inherent in all matter.

Dr. Abbott. By the living matter is meant that which has the power of reproduction or of motion. That is the only way in which it can be defined. A large portion of the human frame is water. No one will claim that this has life; at least there is no way of discovering life in it.

Adjourned.

SECOND DAY.—*Afternoon Session.*

Dr. J. R. Walker, New Orleans, La., read a paper on "Tooth-Culture," of which the following is an abstract:

Upon no other circumstance does the highest development of the individual, and consequently of the race, depend more than upon the power for thorough mastication and comminution of food. The importance of a general dissemination of knowledge concerning the proper conditions for the normal development of a good constitutional character of the teeth, and of the causes which produce abnormal conditions, cannot be over-estimated. Not only should every dentist and practitioner of medicine be thoroughly informed on the subject, but a general knowledge of the laws governing the culture and development of teeth should form one of the primary elements of ordinary education. The teeth at all ages are subject to continual change, those of the aged, even, being liable to become softened throughout their structure by removal of the lime-salts. This process of removing the debris is really a part of the function of nutrition, and it is obvious that under proper conditions, with the proper supply of nutrient material, the necessary chemical elements can and will be restored. A proper understanding of the subject comprises a knowledge of the chemical elements of tooth-structure, and the source whence these are to be most readily obtained, together with the conditions under which, and the means by which, deficiencies can be remedied. The fact that the teeth of those who live in localities where *lime* abounds in the soil, and where the drinking water is impregnated with it, are so much better than in regions where there is a deficiency of lime in the soil, and cistern water is used for drinking and culinary purposes, suggested the administration of lime-water, on account of the difficulty of controlling the diet of the generality of patients. The writer's experience in this connection had been peculiarly interesting and instructive. Practicing in a region perhaps more marked by a de-



iciency of lime than any other within the territory of this association. he had enjoyed peculiarly favorable opportunities for studying the causes and conditions of deficiency and the results of different methods of restoring proper conditions. Among the creoles, or families resident in the Mississippi delta for four or five generations, a good average condition of the teeth prevails; while among the children of those who have immigrated from more favored surroundings, as the blue-grass regions of Kentucky, or the mountains of Tennessee, or Virginia, or of the North, where lime is abundant, furnishing the assimilative organs a liberal supply, there does not appear sufficient power to extract from the limited quantity furnished in diet and drink the necessary amount, and in a period varying from six months to as many years, the teeth of the immigrants become softened and yield readily to any unfavorable conditions. A proper administration of lime-water will not only restore the softened defective teeth of these individuals to a healthy condition, but will enable them to transmit to their children well-developed and substantial teeth, even to the extent of overcoming bad hereditary conditions, the teeth of the children under such circumstances being better than those of the parents. Long experience proves, also, that the proper administration of lime-water usually improves the general health. To those who understand how much good mental, moral, and physical health depends upon good digestion, and good digestion upon thorough mastication, the importance of this branch of the great science of human culture will be obvious.

Dr. Dwinelle said the paper opened a field of labor worthy of the deepest attention. He hopes to present a paper on a similar subject at the next meeting. The relation between man's teeth and his physical, mental, and spiritual nature is apparent to every one. The first important battle Napoleon lost was owing to his having eaten an indigestible dinner. We are, as it were, chemical laboratories. He had once spoken of the mouth as the very doorway of life. According to the presentation of food, and the proper conduct of the processes, is our physical condition, upon which largely depend the mental and moral natures, so that our very dispositions are dependent upon proper digestion. The period of human life is lengthening. He held himself able to show that to our profession more than any other is due this fact. We find children, if properly treated, have more moral and physical courage than the parents who come with them to the office. Often they will undergo operations before which their elders would quail. In this fact is an earnest of even better things to come.

Dr. Allen was glad to see the young men waking up to the fact

that we must use the proper materials to produce good sound teeth, just as the builder must to produce a perfect structure. The substances which are provided by nature, in just the proper proportions, are those which we should use. We undertake to improve on the proportions, and to make up for what we take out by chemical combinations. Take bread, for instance, which is the staff of life. We take out of every barrel of the flour of which it is made forty pounds of the mineral elements—the phosphate and carbonate of lime in the husk—which were put there to give firm, strong bones and teeth. The bread is no better for this deprivation in any way. It is estimated that every child, in a year, consumes one-half barrel of flour. Thus it is denied twenty pounds a year of the elements that ought to be taken into the system to make good bones and teeth. As a result of this starvation we find the child, when twenty years old, probably has not a half-dozen good sound teeth in its head. We find that nations that do not do as we do in this regard, do not lose their teeth, and have no use for dentists. The fault is ours, as a nation. We should work in harmony with nature in this matter, and not violate her laws, or undertake to change them for the better, for we cannot do it.

Dr. Abbott. There may be something in the taking out of the mineral elements of the grain. But the fact of the extension of the average age of the human race—is this due to the fact that the finer flour is more easily digested, if poorly masticated? As far as the speaker is concerned, he finds it difficult to get children or even grown people to eat Graham bread. They take oatmeal as a rule as a medicine. What can we do? We must supply lime in some way, and we cannot get them to eat the oatmeal after one or two doses. Children take it because their parents compel them to. He finds children thus compelled to take oatmeal with miserable teeth and miserable bodies, simply because they do not like it and it disgusts them. In such cases he has given the syrup of lacto-phosphate of lime—even to families of several children—sometimes at intervals for years. It is the simplest form for easy assimilation: Dissolve the phosphate of lime in lactic acid, sweeten, add water, and give to the children as lemonade, and they will take it just as readily. He agreed with Dr. Allen as to the object to be attained, but disagreed as to the method of accomplishing it. The speaker has had mothers under his care from seven months before the birth of their children, and administered the lacto-phosphate for a week at a time for two or three months. He has had hundreds of cases in which the remedy has been used with fair results.

Dr. Allen would positively assert that he has many families tenacious to have their children fed on the proper materials, and he finds

that, though there are exceptions, the children usually have sound teeth. Children can be forced to take what is good for them.

Dr. Patrick. We may give the best food, but unless the individual has plenty of outdoor exercise and pure air, you can not have good digestion. He instanced the case of a lady whose children uniformly had bad teeth. During one of her pregnancies her husband reported to him that she frequently picked lime from the walls and ate it. The result was that the child had good teeth; after that she took lime on such occasions, and all her children born since have good teeth.

Dr. Hunt thought Dr. Walker had arrived at the true secret of the causes and treatment of decay of the teeth. His paper is similar in character to that of Dr. Odell's, read yesterday. In both, the idea is advanced that we must have proper aliment, and proper functional perfection of action of the organs to put the different elements in their proper places. He was glad to see in Dr. Walker's paper the recognition of the fact that lime-water helped the character of the teeth and the general health also. We all know that lime-water is an excellent preventive of dyspepsia. We find a condition that seems to refute Dr. Allen's theory in the fact that nations and peoples in whose food grain plays almost no part have good teeth. Dr. Winder read a paper in 1875 on "The Teeth Ethnologically Considered." In preparing the material for that paper he was permitted to examine the skulls in the collection of the Army Medical Museum. He found the Esquimaux, the Sandwich Islanders, and the Northwest Indians, before they were degraded by intercourse with the white man, all had good teeth. Here it was seen that while the character of the food of the three races was materially different, the result as shown by the teeth was the same. In one thousand crania examined—of uncivilized races—only fifty defective teeth were found. A curious feature was noted—wherever there was a cross of the white male upon the Indian female, the offspring showed irregularity and defective structure in the teeth. One thing was shown, that with a plain, natural mode of life, where there might be deficiency of phosphates, the food would be used so well as to produce the best results. In our grain there is more of the phosphate element than is necessary for the repair of waste, as he believed, so that there may be no want in the pregnant woman.

Dr. Abbott. Where lime-water has the effect to cure derangement of digestion, you will find that something has been taken to cause it. Tea, in his opinion, is doing more to derange digestion than almost anything else. It is one of the worst enemies to perfect function in that direction. In many cases, it is not more than ten minutes after the tea has been drunk before the victim has a sour stomach.



It irritates the mucous membrane lining the stomach, producing an extraordinary flow of the gastric juice. Some years since he found himself greatly annoyed by a sour stomach, and that distressing feeling which is denominated "heartburn," and he noticed that it invariably occurred shortly after drinking tea. As an experiment, he stopped the use of tea for a week; he could eat or drink anything else without the trouble, but just as sure as he took tea, in less than ten minutes he had a sour stomach. He then stopped the use of tea absolutely, and since that time, now some six or seven years, he has been troubled only once or twice. Dr. Hunt struck the keynote of the argument when he said that the food was supplied with more of the phosphates than was needed by the system, as shown by the large amounts excreted. On what other basis than a superabundance in the food could we account for the excess in the excretions?

In reply to a question from the president, Dr. Abbott said he should prepare the syrup of lacto-phosphate of lime, of which he had spoken, as follows: Dissolve two and one-half grains of the phosphate of lime in a drachm of lactic acid; add simple syrup until agreeable to the taste. A teaspoonful would represent about a grain of the phosphate. The dose should be, for an adult, a table-spoonful three times a day; for a youth from ten to fifteen years of age, a dessert-spoonful; for a smaller child, a tea-spoonful, and for a very small child, a half-tea-spoonful.

Dr. J. G. Ambler had observed that at certain seasons of the year more of the phosphates was required than at other times. Thus, in the fall when much fruit is eaten, the system requires an increase of antacids to counteract its effects. In the absence of this increased quantity at such periods, there would be an excess of acids in the secretions which would cause decay of the teeth. He related a case of a person who used vinegar to excess, for years. The patient finally died of general prostration. A day or two before death, the muscular exertion of raising an arm broke the bone. After death, examination revealed the fact that the bones were almost like chalk; the system had been starved of phosphates. A child was brought to him with teeth that seemed charred—they appeared to be wearing away at places where there was no antagonism. Lime-water was administered three times a day with marked success. He uses it largely in practice, not only internally, but as a rinse night and morning. In cases of extreme tenderness of the teeth, he orders bicarbonate of soda, applied just before retiring, and in nine cases out of ten the treatment is followed by relief.

Dr. Swift disagrees as to the advisability of building up the child's osseous system *in utero*, because that course would increase the pain

and peril of the mother in labor. If, during gestation, the mother is deprived of the elements which form the osseous system, the child will be easily delivered, because the bones will be cartilaginous, and you can then build up the system of both mother and child. This idea he imbibed from reading a work on "Parturition without Pain," which directed that the mother be deprived of animal food and rich grains; give her all the fruits she wants; six lemons a day will do no harm if she wants them. This course would prevent the calcification of the bones of the fetus, and make the labor easy. He would say that the physique of children born under such circumstances was as good as the average, or better. Some years ago he had a patient, a girl of eleven, who was brought by her parents. An examination showed a dozen cavities in her teeth,—four of them approximal cavities, between the front teeth. The teeth were so sensitive that the touch of an instrument on the enamel caused agony. The parents insisted on having the cavities filled, and stated that they would compel the child to submit to the operation. He refused to operate under the circumstances, but directed them to plaster up her teeth with prepared chalk, thoroughly, every night, and to have her swallow any of the chalk she might desire to spit out. This was done, and at the end of a year, out of the dozen cavities, he could find only two; all those in the sulci had thoroughly sealed themselves.

Dr. Walker had been discouraged in his experiments by his lack of success in finding the proper form. The effort was to find a phosphate, but the fact that in the limestone regions the form afforded is a carbonate supplied the clue; it being plain that the carbonate would be converted into a phosphate in the system. That there may be a superabundance of phosphates does not alter the fact that the nearer we approach to the proper proportions the better it will be assimilated. A fact which he had noticed was that people who use melted butter largely are more prone to calcareous deposits about the teeth than those who do not.

Dr. R. B. Winder thinks one of the most important questions is that of the chemistry of decay. He is not thoroughly satisfied that decay is produced absolutely by acids, nor with the opposing theory. Both theories have their supporters. When we examine the teeth of the savage races, whether the food be animal, or vegetable, or of fruits, we find that a good type is abundantly produced. If it be true that acids cause decay, he cannot understand why they do not attack and destroy the calcareous deposits. Are teeth in limestone districts better than those of other regions? So far as his observation goes this is not true—at least, not markedly so. Some of the best teeth he has ever examined were from alluvial lands, where

there was no limestone. He does not believe there is anything like an ideal taste in the palate. Tastes change and vary according to conditions. He would rather trust to nature in the pregnant woman to dictate what she should eat, than to any arbitrary treatment. The highest quality of tooth-structure is found in the carnivora, which fact does not give us much light on the matter.

Dr. Rich had tried to promulgate the doctrine that dentists ought to be apostles of the proper mode of producing sound teeth. You may put into the mouth what food you please, but unless you have perfect assimilation you will fail to produce good results. In early life he had spent several years among the Arabs and savage tribes, and he had found the teeth almost always good among those who took proper exercise. The Indian mother works hard, and when the time arrives for the birth of her child—it may be while the tribe is on a journey—she goes off by herself, accomplishes its delivery alone and unassisted, and resumes her journey. He would particularly enjoin on women a much larger share of exercise than they ordinarily take, in order that they may assimilate their food properly. Delicate, frail teeth are the curse of civilization, because of the absence in civilized life of the means of physical exercise, and hence because of the lack of physical qualifications for the duties of life. Physical exercise had been a hobby with him. Many years ago in pursuance of his ideas he had founded a physical school which he conducted successfully for five years, and he was convinced that much good had been done his pupils, but other duties compelled him to abandon it. Among the pupils was a young married lady, a fine, healthy, hearty woman, whose first child weighed fourteen pounds at birth, and nearly killed her. Five years later, while she was attending the school, she again became pregnant. She continued her exercises in the class up to the very day of her confinement. The child weighed but six pounds, but was very hearty and vigorous—so strong and active that it was a task to hold it. Half an hour before the child was born the mother ran up a flight of stairs. Unless you have robust health you cannot have perfect assimilation, and you cannot have robust health unless you have good teeth. If we could go right down to the fountain-head of degeneration—decay of the teeth—and remove it, the difference in the quality of the human race wrought by the improvement of the teeth would be surprising. In regard to the sour stomach spoken of by Dr. Abbott, the speaker does not believe that tea had anything to do with it; it was the milk in it that caused the mischief. The Chinese, who know how to make tea, never put milk in it—that is an Anglo-Saxon “improvement.”

Dr. Winder agreed with Dr. Rich as to the necessity of more ex-



ercise for females, which view is borne out by the testimony of Herbert Spencer, who ridicules the whole system of female education in America. Spencer thinks, in order to produce the highest possible type of mankind, that we must cultivate the *intellect* of the *father* and the *physique* of the *mother*. Some time since he (Dr. Winder) met two young ladies, honor girls from one of our most celebrated institutions of learning for females, suffering from softening of the brain, evidently caused by excess of mental labor. A gentleman, one of the most experienced teachers within his acquaintance, had said to him that boys should be treated exactly like monkeys until they were fifteen years old. The present system of education was a bad one. There was no knowing the amount of damage done by it.

Dr. Dwinelle. The phosphate of lime from the rocks is not assimilable in the human system; that derived from the bones of animals is. It makes no difference what we use if it be not in a condition for assimilation.

Dr. Walker finds that all localities are characterized by the type of people inhabiting them and by their products. His own locality is subject to particularly unfavorable conditions; frequently the deciduous teeth have to be removed before the normal proper time. The human race has a wonderful power of adaptation, though it takes sometimes from two to five generations to accommodate it to changed surroundings. In cases where we cannot change the conditions, the use of lime-water will be a protection in a large degree from deleterious influences.

Adjourned to meet in Washington, August 3, 1882.

## INTERNATIONAL MEDICAL CONGRESS, 1881—SECTION ON DISEASES OF THE TEETH.

### FIRST DAY.

THE first general meeting of the International Medical Congress was held in London on August 3, H.R.H. the Prince of Wales and H.I.H. the Crown Prince of Germany being present.

Sir James Paget was elected President of the Congress, and delivered his opening address.

The first meeting of Section XII. (on Diseases of the Teeth) was held at 3 P.M. on Wednesday, August 3, 1881, Edwin Saunders, Esq., F.R.C.S., President.

The President rose and said: In strict fulfillment of the programme issued by the Executive Committee of this Congress some months since, our section opens at the appointed hour. The rules which

have been drawn up by the committee for our guidance are, for the most part, those which govern all deliberative assemblies in this country, and, therefore, need not be reiterated.

He then proceeded to deliver an inaugural address, of which the following is an abstract:

Permit me, gentlemen, on behalf of the English members of the Congress, on behalf of our largest society, The Odontological Society of Great Britain, now in the twenty-fifth year of its somewhat checkered, but, on the whole, prosperous existence, and on behalf of the whole body of the dental profession in England, to offer you a hearty welcome, and to assure you of our earnest desire to render your too brief visit both profitable and pleasant. We hail the happy occasion of our friendly intercourse, and we trust that friendships begun under such benign auspices may continue and progress in interest through many prosperous years. Such gatherings as these, with the pleasurable amenities they involve, do much to soften and refine the manners, to quicken the intellect of all concerned, and to remove misconceptions of national or individual character which are apt to be engendered by isolation and want of friendly intercourse. Congresses such as that at which it is our privilege at this time to assist serve a great social purpose, apart from the intellectual and scientific aims at which they are more immediately directed. It is much that they afford an opportunity and a stimulus for intellectual effort, which might otherwise, with man's proverbial procrastination, never be called into action. But in these days of an ever-teeming press, and facilities for the free intercommunication of ideas, this is subordinate to the advantage of personal knowledge of the individual, and the living change of thought. The modern congress which seems now in high favor owes its existence, or shall it not be said, its revival, to the intellectual activity, joined with a wide eclecticism, which is a characteristic of our times, and which seeks to assimilate to itself whatever is of value in the past, or in other lands, whether in social manners and customs, in matters of dress or daily life, in schools of architecture, or in the realms of science or art. The generally accepted idea of a congress is, if I mistake not, more than a fortuitous assembly of persons engaged in similar pursuits and drawn together by community of thought and interest. It is the deliberate coming together of distinguished men, or of experts, of set purpose and for a specific object; the persons constituting the congress being invited and selected with a due regard to their knowledge of the subject for the consideration of which it has been convoked. Ours is a Congress of peace, and we are happily not called upon to compose animosities or to adjudicate upon conflicting claims. The triumphs which we are met to celebrate are those of man's skill in limiting

and repairing the ravages of disease; our victories, those over nature herself, when she is forced to yield up another of her secrets as the reward of patient research or of well-conducted experiment. Our international reunion may be regarded as a periodical taking stock of the gains of science, of improved appliances, of more accurate means of diagnosis, and of more efficient modes of treatment in the various departments of medical practice. And for the better and fuller carrying out of this intention, it has been found advisable, having regard to the present advanced state of medical and surgical science, to divide the work of the Congress into sections.

These sections carrying on their work simultaneously, and the work of each section being complete in itself, greater fullness and accuracy of detail are secured without any sacrifice of the unity of the one grand result, as the work of each section is the necessary complement of the whole. In that with which we are more immediately concerned,—one of the youngest departments of surgical practice, and which for the first time enjoys its own distinct and prominent position,—considerable interest will attach to the question of education and the regulations which in each country govern the entrance into the profession. The former part of this very important subject will, I trust, shortly be brought under the notice of the Congress by one than whom none is at once more fully informed, and more entitled to speak with authority—I mean Mr. John Tomes; who has in this direction during the last quarter of a century done much to advance the interests and to establish a strong claim on the gratitude of the profession. Nor would the English sense of justice and fair play be satisfied without an acknowledgment of the more recent services of his colleague in this good and great work, Mr. James Smith Turner, without whose unsparing devotion of time and energy it could not have been brought to so successful an issue. To the joint action of these two gentlemen, to the lawyer-like precision and forethought of the former, no less than to the vigilance and promptitude of the latter, is this profession indebted for that invaluable piece of legislation, the Dentists' Act of 1878. It must not be forgotten, however, that to our foreign friends the nature of the enactment is of greater interest than the means or the persons by whom it was obtained. By the provisions of this Act, then, which came into operation on August 1, 1879, it is forbidden to anyone to use the word dentist, dental practitioner, or other title implying that he is qualified to practice dental surgery, unless his name appears on the Register of that body, thus giving to the dentist the same protection and privileges as are enjoyed by the physician and surgeon in this and other countries. By this measure the opprobrium was removed which so long rested on the dental



profession in this country, that it included a large proportion of ill-qualified practitioners, and in many cases persons who were unsuccessful in other pursuits, and who were attracted to it by the absence of restrictions or of preliminary examination. By the provisions of this Act, introduced by Sir John Lubbock, not only are the public preserved from the extortion and malpractice of the ignorant and unprincipled, but a grave discouragement is removed from the educated and honest practitioner. For it is only in human nature that high names and honest, zealous work should languish in the atmosphere of indifference and lack of appreciation. In thus obtaining legal sanction for the organization of the profession, it was desired strictly to maintain its connection with the Royal College of Surgeons, as it was rightly felt that separation from that body would involve abdication of the status which it had hitherto enjoyed. And when the college had been memorialized on the subject, showing that the curriculum for the diploma for general surgery, which was the only qualification then open to him, did not comprise certain matters of the first importance to the dental practitioner—that, in fact, the entire subject of dental surgery found no place either in the teaching or at the examining board—an arrangement was accepted for more fully meeting the requirements of the case. Accordingly a conjoint board of examiners, consisting of half surgeons and half specialists, was created for the licentiateship of dental surgery, with a corresponding modification of the prescribed course of study, eliminating much that was of little value and substituting what was regarded as specially necessary in that particular line of practice. Thus, by varying but not lowering the educational standard, an arrangement has been effected which, if not in all respects perfectly satisfactory, goes far to meet the reasonable views and wishes of those who have the welfare of the profession at heart. With this bare outline of our proceedings in reference to the organization of the profession before us, we shall listen with interest to what has been accomplished in other countries in the same direction, not, it may be hoped, without mutual profit and advantage.

Gentlemen, I feel that I ought not longer to tax your attention. Having declared this section of the Congress open, we may now prepare ourselves to listen with appreciation and enjoyment to those varied and valuable contributions to the literature of our specialty with which we are so liberally favored both from home and foreign sources. And, first, your attention will be asked for the always welcome utterances of one whose contributions to science during a long series of years, many of them having a direct interest for our own specialty, and almost unparalleled for number and value, have made his name a household word in both hemispheres. I mean

Professor Owen. We feel grateful for his presence here to-day, which will confer prestige on our proceedings, and we tender him with our thanks our sincere felicitations that he has been able to witness, in unimpaired health and energy, the realization of his hopes and wishes in the completion of that noble structure, the Museum of Natural History.

Professor Owen delivered an address on the Scientific Status of Medicine, in the course of which he pointed out the necessity of raising the study of odontology to that of a science, thereby elevating the status of the dental profession. He craved the indulgence of his audience while he, as one who had long ago ceased to practice a profession termed by the old Greek writers "divine," occupied their time. He alluded to the stereotyped principles of treatment in certain maladies, as dyspepsia, gastrodynia, peritonitis, pleurisy, pneumonia, etc., and, representing a case where all those conditions co-existed, the advanced medical man, instead of treating each condition, would seek for the cause, and by microscopic examination of some of the food taken, detect *Trichinæ spiralis*. In that way would he be able to give a true account of all the symptoms enumerated. Likewise, when finding trichinæ in food, some of which had been taken, would he be capable of predicting the conditions and symptoms that would follow. His (Professor Owen's) aim was to exemplify under what conditions medicine would be designated an Art, and in what it belonged to the higher altitude of Science. The scientific status of the profession is indicated by the terminology fully expressing the disease to which the name is applied. According to the degree in which uncertified dentists, chiropodists, and such like, flourished, in that degree will the status of the inductive science of medicine be indicated.

#### SECOND DAY.

Dr. Magitot, Paris, read a paper "On the Present Condition of the Operation of Replantation for the Cure of Chronic Alveolar-Periostitis of the Apex of the Root," giving the results of one hundred operations undertaken for the cure of that disease. These results were arranged in tables analyzing the one hundred cases, showing the age and sex of the patient, the tooth affected, the nature of the malady, its duration and the date of the operation, the extent of the resection practiced, the time taken in consolidation, the time during which the result had been maintained, and, lastly, the different accidents which complicated the treatment. The results were established by the tables, and proved that chronic alveolar-periostitis was curable by replantation in ninety-two per cent. of the cases.

Dr. W. Finley Thompson, London, read a paper on "Replantation."

Before entering upon the practical bearings of the subject, he briefly considered the histological relation of the dental pericementum, and said it was to the vitality and function of the cellular elements in particular that we must have the greatest regard in considering or treating any pathological condition of the dental pericementum. In dealing with the question, Shall the system of replanting teeth, under any circumstances, be a recognized operation in dentistry? Dr. Thompson contended that the system should not be introduced into practice save in severe and otherwise hopeless cases. What advantages, in contradistinction to the disadvantages, may be claimed for replanting? Also, what percentage of cases are successful? Those who have treated chronic alveolar abscess must, at times, have experienced the uncertainty of their efforts. Day after day, perhaps for weeks and even months, have patients been subjected to the inconvenience of almost daily attendance upon their dentists, with but doubtful benefits being conferred, resulting, perhaps, in only temporary retention of the tooth. Shall we not consider this a case open for the adoption of any means promising relief? Among the disadvantages in this treatment, we have to combat the antagonism which naturally arises from the mere mention of an operation which is repugnant to the feelings of the patient. With the extraction there is rupture of the nutrient structures, and several days must be required to establish reunion of the parts. Then, there is the uncertainty of successful extraction of the tooth and the shape of the root.

In chronic abscess, where the apex of the root has lost its pericementum, Dr. Thompson excises the denuded portion of the root and restores it with a cap of gold; the object of this being to prevent absorption. To remove inflammatory products, instead of drilling through the alveolus, or cutting a gutter along the roots, a tube is fixed in the pulp-canal, extending from the gold cap at the apex of the root to the grinding-surface. To the cap he could not, from his experience, ascribe much of the success he had had; but the tube, inasmuch as it permits of drainage, he deems all important. His successes were eighty-eight per cent.

In the discussion which followed the reading of the two papers on replantation, Mr. C. S. Tomes read an abstract from an old book written at the time John Hunter was working at that subject. It was stated that a lady fell a victim to venereal disease through a tooth being transplanted from a syphilitic girl. Ulceration became manifest in the mouth and on all parts. These and other syphilitic symptoms disappeared as the result of treatment with mercury, but the patient eventually died of hectic. The danger of communicating



disease by transplanting teeth was by the writer considered as sufficient reason for his endeavor to banish from surgical practice such a mode of treatment.

Dr. Taft, Cincinnati, said the subject of replantation was one at which many of them had been working during the last few years, and there were many phases in their opinions. But theory must ever be secondary to practical points. The cases in which replantation should be performed were those where teeth are accidentally removed, and in obstinate cases of alveolar abscess, when failure of treatment in the mouth followed even the best efforts; also where chronic sinuses existed,—more common in the lower than in the upper jaw. In many teeth so affected there was a deposit upon the root, low down below the reach of scaling instruments. In every instance in which a healthy tooth in a healthy person was replaced, he should expect immediate and permanent union. The treatment was more successful with the anterior teeth than with the molars, and this was due to the greater mobility of the molar teeth. He had seldom seen replanted molar teeth last more than four years, while he had found the bicuspid last longer. What was the method of union? It was just the same as under any surgical operation; the reparation was of the same character. It was cicatricial tissue which formed the bond of union between the tooth and the alveolus. The presence of pericementum upon the root is valuable, but not essential to repair. He had seen cases in which it had been removed, and the tooth became quite firm and continued to be so; and in one of those instances the pulp-vessels had united, and the pulp lived.

Mr. Coleman stated that twenty years ago his attention was directed to replantation of teeth. There was nothing new in the mode of practice he then pursued, but perhaps it had this novelty, that in the opinion of those who had gone before, a diseased tooth should not be replaced in a diseased socket. He dissented from that, and by the use of antiseptics he thought he might succeed, but his cases were failures. He next compared the operation to that of ovariectomy, in which all diseased tissue is removed; and in a much improved method of replantation Dr. Magitot removed all diseased structures. This procedure in replantation, and the principles of drainage which had been illustrated that morning, promised great success. The saving of teeth was merely a relative term, but if by replantation they could preserve a tooth for even one year, that was an advantage.

Dr. Atkinson, New York, said, when they understood the histological condition of the tissues represented in the diagrams Dr. Thompson had placed before them, they will have advanced. A question he would ask was, Are the lime-salts held in solution in the

embryonal tissue? It was such questions as that that they must understand before they could decide upon the subject of replantation of teeth.

Mr. Balkwill, Plymouth, spoke of the conditions in which success may occur in cases of replantation, as, for instance, the form of the roots of front teeth. There were certain questions about which he had not yet been able to satisfy himself. He could understand the reunion of the pericementum, but the recommencement of the circulation in the vessels of the pulp had always been a matter of difficulty for him to realize. Of replanted teeth, in which the diseased pericementum had been scraped off, he had not had any personal experience, but he had observed several instances of absorption of the roots. One case, in which the pericementum had been scraped off, he had the opportunity of seeing several years after the operation. The tooth was firm, but the crown was carious. He excised the crown, and pivoted an artificial crown upon the root. At the present time—four years after the pivoting—the root is still quite firm.

Dr. Islai Jozsef, Budapest, expressed a doubt as to the utility of the operation in cases of alveolar periostitis, and preferred treating such cases by disinfecting the pulp cavity. He related a case in which, in extracting an impacted and irregular lower molar, he accidentally, though unavoidably, removed the second bicuspid. This latter he replaced, and two years after the tooth was firm, and as sensitive to heat and cold as were the neighboring teeth. He said that in Bonn there was a specimen of a longitudinal section of a dog's jaw and tooth. The latter had been replanted, and the blood-vessels of the pulp are shown to be united and continuous with the trunk in the bone. Another and similar case is in Berlin.

Mr. Spence Bate, F.R.S., said his first case of replantation dated back some thirty-seven years ago. In 1849, a patient had eight teeth knocked out; these he replaced and supported with a plate, and they did well. His experience differed from that of Dr. Magitot and others. He drilled through the alveolus into the cavity of the abscess, and did so with the greatest confidence of success. If the pericementum became separated from the root, his opinion was that no connection recurred, but necrosis followed. His opinion went dead against the practice of replanting in cases where extensive inflammation existed.

After some remarks from Mr. S. J. Hutchinson and Mr. Brown-Mason, the discussion ceased.

Mr. D. Corbett, Dublin, read a paper entitled "Interrupted Second Dentition as a Cause of Reflex Constitutional Disturbance," in which the importance of dental experience in many otherwise medical cases was especially insisted on.

Dr. Arkövy, Budapest, read a paper describing "Experiments on the Action of Agents used for the Devitalization of the Dental Pulp."

The author having referred to the paper on the subject by Dr. ———, Paris, stated that he had experimented upon dogs in the University of Budapest, with the object of discovering the relative influence of different agents as devitalizers of the tooth-pulp. Briefly, his conclusions were that arsenious acid and pepsin are the only available agents; that neither acts except when in direct contact with the pulp; that arsenious acid is the more powerful, but at the same time by far the more dangerous of the two, and that in certain cases which he formulated pepsin should be used in preference. Arsenious acid causes inflammatory action and capillary emboli, and renders the red corpuscles pale and colorless. The axis-cylinder of the nerve-fibers becomes granular, tumefied, and notched, and the neurilemma is also changed. There is an alteration of the whole pulp, and the periodontal membrane is injected. No action was observed upon the dentine, save, in some cases, slight tumefaction of the fibrils.

Pepsin does not cause the red blood-corpuscles to effuse their contents into the surrounding tissues, but they rather become darker in color. It produces fatty degeneration of the capillaries, and also forms a distinct line of demarkation in the pulp to which it has been applied, while it is less likely to produce periostitis than arsenic.

Mr. Thomas Gaddes, L.D.S., Eng. and Edin., read a paper on "Dental Surgery in the Army."

Cognizant of the notable fact that the executives of the International Medical Congress have, for the first time, so recognized dental surgery as to set apart a special section for that branch of surgery, likewise that this Congress is scientific, not only in the common acceptance of the term, but scientific also in the medico-social sense, it may not be inopportune to solicit the opinion of this section—so weighty and so influential—upon the question of Dental Surgery in the Army.

The regular forces of the British army consist of 191,000 men; the average number abroad being 103,000; the average number at home, 88,000.

For this great number of men, who are the units of Her Majesty's power, there is provided a specially trained and examined medical staff. The special subjects of study and examination of the Army Medical Department are medicine, surgery, and hygiene. Therefore, we may infer that the health of the soldier is the immediate consideration of that department.

I need not before this dental section of the International Medical



Congress set forth the relation of the teeth, and the importance of dental surgery to the general health. Their association is too well known, not only to the specialist, but also to the observing physician and surgeon. Yet, in the face of these facts, army medical officers have not to receive, neither, as a rule, do they obtain, any special instruction or experience in the treatment of the common, and often very painful, diseases of the teeth.

In 1858 the Royal College of Surgeons of England, recognizing the special nature of dental surgery, and the inadequacy in this respect of the education for the fellowship and membership of the college, instituted a specific dental curriculum, examination, and diploma. Furthermore, the council of this college decided not to accept the signatures of teachers of dental surgery unless they possess the license in dental surgery,—the certificate of a fellow or member only is not recognized. The specialty of dentistry has also been recognized by the Royal Colleges of Surgeons of Edinburgh, and in Ireland, and by the Faculty of Glasgow. These bodies, under the powers of the Dentists' Act, 1878, have adopted the dental curriculum recommended by the General Medical Council, and now hold examinations and grant degrees in dental surgery. By the Parliament of 1878, by the General Medical Council, by the Royal College of Surgeons of England, and the other surgical corporations, has the necessity for, and the special nature of, dental education and examination been sanctioned. Yet dental surgery is totally ignored, and enters into no part of the special training required by the Army Medical Department. The result of this is that the non-commissioned officers and men of the British army receive from the Army Medical Service, as a whole, such treatment as must, from the nature of the case, be far inferior to the skill in medicine, surgery, and hygiene, displayed in the highest degree by members of that service. And, where treatment for diseases of the teeth, from which of a certainty nine-tenths are sufferers, is not given by the army surgeon, relief is not infrequently sought and obtained at the hospitals of the charitable, maintained for the necessitous poor only. Furthermore, how many teeth are lost which might, in these days of conservative dental surgery, be saved? How much suffering, before their loss, and also after their loss, is endured by the brave-hearted, for the want of the administration in the army of an organized system of dental surgery?

That there is a necessity for such an administration all must agree; but the question how such is to be accomplished will require careful consideration.

Several members of the Army Medical Service, wishing to improve their knowledge and skill in dentistry, have attended the

special course of instruction at certain of the dental schools, and have qualified themselves by taking the diploma in dental surgery. Though these are very exceptional instances, they indicate the feeling of want of knowledge in dental matters, which is truly the general feeling of the Army Medical Service.

To meet the requirement of a better administration of dental surgery in the army than has hitherto existed, the most feasible means would be to impart to the army medical candidates special instruction. This might be done by a systematic course of lectures and of operative work, to be included in the subjects of study at Netley; and, finally, let the pass-examination include questions, and, above all, practical work, in dental surgery.

Mr. Alfred Coleman, F.R.C.S., etc., read a paper "On the Administration of Anesthetics at the Dental Hospital of London, since 1868." Since the year 1868, anesthetics had been administered within the walls of the hospital 20,000 times. In the majority of administrations nitrous oxide was used; next in order came ether, ether dichloride, chloroform, and other agents. Mr. Coleman prefers nitrous oxide and ether as an anesthetic for those dental operations where a longer period of anesthesia is desired than is obtained from nitrous oxide alone. No dangerous case had arisen that could be attributed to the nitrous oxide and ether; and in that large number of exhibitions only two cases had occurred in which there was any systematic artificial respiration resorted to.

(To be continued.)

### WISCONSIN STATE DENTAL SOCIETY.

At the last meeting of the Wisconsin State Dental Society, held at Milwaukee, July 20, 1881, the special committee appointed to draft resolutions concerning the Wisconsin Dental College reported as follows:

WHEREAS, Circulars and advertisements have been widely circulated by parties from Delavan, Wisconsin, claiming to be "The Faculty" of the Wisconsin Dental College, and regularly chartered under the provisions of chapter 86, revised statutes of 1878, offering "to confer" a diploma and degree of "D.D.S." without any apparent intention on the part of said "faculty" of properly educating persons, or without ever having so done in accordance with the demands of all reputable colleges in all professions, thereby cheapening and lowering the dignity and standing of the dental profession in the estimation of the public, as well as endangering its safety in the licensing of incompetent persons to practice dentistry, and to place such on a par with men of known skill and experience; therefore,

*Resolved*, That the Wisconsin State Dental Society hereby denounces all organizations or institutions purporting to be dental colleges, whether chartered or not.

which do not require and are not prepared to give a thorough and complete course of study in all branches of our specialty, as would be required in order to receive recognition by the American Dental Association.

*Resolved*, That we refuse to recognize or place any value upon any diploma or degree issued or furnished by the so-called Wisconsin Dental College; that we hold in contempt the authors and managers of this concern, who have by their action brought odium upon the profession of this State; and, that in the future, as during this session of this society, no person connected with it will be recognized as entitled to a seat in our meetings.

*Resolved*, That copies of these resolutions be furnished the daily press of this city, and our professional journals for publication.

W. H. CHILSON,	} Committee.
G. H. McCAUSEY,	
EDGAR PALMER,	
CHAS. C. CHITTENDEN,	
ARTHUR HOLBROOK,	

The resolutions were unanimously adopted.

By a unanimous vote, a committee, consisting of Drs. Chittenden, Palmer, and McCausey, was appointed to present the facts in relation to the dental college at Delavan, and in behalf of the State Dental Society, to ask the Legislature at its next session to annul the charter of the college.

The election of officers for the ensuing year resulted as follows:

*President*.—George H. McCausey, Janesville.

*First Vice-President*.—S. L. Judd, Beloit.

*Second Vice-President*.—E. C. Stewart, Waupun.

*Secretary*.—R. G. Richter, Milwaukee.

*Treasurer*.—R. W. Hurd, Madison.

G. H. McCAUSEY, *Secretary*.

### SOUTHWESTERN DENTAL SOCIETY.

THE second annual meeting of the Southwestern Dental Society was held at Columbus, Kan., August 9, 10, and 11, 1881, in the office of Dr. J. O. Houx. Dr. E. Hovey, Springfield, Mo., president, in the chair.

The following were elected officers for the ensuing year:

*President*.—G. A. Keyes, Girard, Kan.

*First Vice-President*.—J. O. Houx, Columbus, Kan.

*Second Vice-President*.—S. J. Lindsey, Carthage, Mo.

*Secretary*.—James M. White, Carthage, Mo.

*Treasurer*.—C. F. Wright, Springfield, Mo.

*Executive Committee*.—E. Hovey, C. F. Wright, and E. N. LaVeine.

JAMES M. WHITE, *Secretary*.



## CONNECTICUT VALLEY DENTAL SOCIETY.

THE annual meeting of the Connecticut Valley Dental Society will be held at the Haynes House, Springfield, Mass., October 27 and 28, 1881, commencing Thursday, the 27th, at 10.30 A.M.

The final report of the Committee on Revision of the Constitution and By-Laws will be submitted. The committee earnestly desire a full attendance.

A. M. Ross, *Secretary*.

## THE DENTAL COLLEGES.

WE present the following list of dental colleges of this country and Canada, with the names and addresses of the executive officers.

BALTIMORE COLLEGE OF DENTAL SURGERY. F. J. S. Gorgas, Dean. 259 N. Eutaw St., Baltimore, Md.

OHIO COLLEGE OF DENTAL SURGERY. H. A. Smith, Dean, 286 Race St., Cincinnati, O.

PENNSYLVANIA COLLEGE OF DENTAL SURGERY. C. N. Peirce, Dean. 1415 Walnut St., Philadelphia, Pa.

PHILADELPHIA DENTAL COLLEGE. J. E. Garretson, Dean. 1537 Chestnut St., Philadelphia, Pa.

NEW YORK COLLEGE OF DENTISTRY. Frank Abbott, Dean, 22 W. Fortieth St., New York, N. Y.

MISSOURI DENTAL COLLEGE. H. H. Mudd, Dean, 502 N. Fourteenth St., St. Louis, Mo.

BOSTON DENTAL COLLEGE. J. A. Follett, Dean. 219 Shawmut Ave., Boston, Mass.

HARVARD UNIVERSITY, DENTAL DEPARTMENT. Thomas H. Chandler, Dean, 74 Commonwealth Ave., Boston, Mass.

DENTAL COLLEGE OF THE UNIVERSITY OF MICHIGAN. J. Taft, Dean, Ann Arbor, Mich.

WESTERN COLLEGE OF DENTAL SURGEONS. C. W. Spalding, Dean, 1525 Olive St., St. Louis, Mo.

UNIVERSITY OF PENNSYLVANIA, DENTAL DEPARTMENT. Chas. J. Essig, Secretary of the Dental Faculty, N. E. cor. Sixteenth and Locust Sts., Philadelphia, Pa.

DENTAL DEPARTMENT OF THE UNIVERSITY OF TENNESSEE. R. Russell, Dean, 53 N. Summer St., Nashville, Tenn.

INDIANA DENTAL COLLEGE. Junius E. Cravens, Secretary, Indianapolis, Ind.

DENTAL DEPARTMENT OF VANDERBILT UNIVERSITY. W. H. Morgan, Dean, Nashville, Tenn.

KANSAS CITY DENTAL COLLEGE. John K. Stark, Dean, Kansas City, Mo.

ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO. J. Branston Willmott, Secretary, Mechanics' Institute, Toronto, Canada.

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DEFORMITIES OF THE MOUTH, CONGENITAL AND ACQUIRED, WITH THEIR MECHANICAL TREATMENT. By OAKLEY COLES, Dental Surgeon to the National Dental Hospital and to the Hospital for Diseases of the Throat, etc. Third Edition. Philadelphia: Presley Blakiston, 1881.

The first edition of this book was published in 1868. It was followed in 1870 by a second edition, much enlarged. The present edition has been carefully revised, a considerable portion rewritten, three new chapters added, the number of wood-cuts increased from fifty-one to eighty-three, and the drawings on stone from nineteen to ninety-six.

The treatment of congenital cleft palate, as well as that of acquired deformities, has received of late years much attention, alike from the stand-points of surgery and mechanics. The author, while recognizing the soundness of that system of curative dentistry taught by Kingsley, does not undervalue the merits of the surgical operation, admitting that, provided the conditions of the parts be suitable, the surgical operation, being done once for all, is superior to any mechanical contrivance that must necessarily be renewed from time to time. The question therefore turns, he says, on what is a suitable condition of the parts for operation. These are briefly as follows: 1. A sufficient substance on each side of the cleft to admit of freely paring the edges. 2. An amount of mobility that will admit of the free borders easily approximating. 3. A sufficient length of the central portion of the cleft palate, when united, to produce perfect closure between the naso-pharyngeal cavities.

The subject is comprehensively treated in a discussion of the anatomy of the normal palate; the development of the palate and surrounding parts; the etiology, anatomy, and physiology of cleft palate; the classification of deformities of the upper jaw; the correlation between the palate and the cranium; the troubles arising from congenital cleft; an account of the appliances used for remedying cleft palate, from A.D. 1552 to the present time; the mechanical procedures from the impression to the introduction of the instrument into the mouth; subsequent tuition of the patient; a history of the treatment of various cases; a special chapter on the defects of the palate arising from syphilis, and another on the treatment of gunshot wounds of the face and maxillæ.

We commend a careful study of this volume to all practitioners, whether special or general, who propose the treatment of cleft palate, either surgically or mechanically.

## PERISCOPE.

BUCHANAN'S PARCHMENTS INVALIDATED IN SPAIN.—Minister Fairchild has forwarded to the State Department at Washington a copy of a royal order issued at the suggestion of the Spanish Director of Public Instruction, and aimed to invalidate every Buchanan diploma that may be current in Spain and Cuba. The order is here given:

Excellency: The Chargé d'Affaires ad interim of Spain at Washington reports to this Ministry, by dispatch Number 52, dated 30th of March last, as follows:

"For many years in different countries of Europe, especially in Germany and England, attention was attracted to the extraordinary number of diplomas of Doctor in Medicine, issued by scientific establishments of the United States. Suspicions as to the validity of these diplomas originated through the representatives of said countries, and the American authorities caused inquiries to be made, which have lately resulted in the discovery that for many years frauds have been committed on a gigantic scale. It has been discovered that one Dr. Buchanan, of Philadelphia, director of some establishment of medical teaching, and founder of some purely imaginary, had been trading for more than twenty years past in doctors' diplomas, which, by himself, or through agents, he sold at reasonable prices here and in Europe. The said individual, who is now in prison and under indictment by the tribunals of Philadelphia, confesses that during his long career he has sold twenty thousand diplomas in the United States, and forty thousand abroad. This is so considerable a number that it seems there is perhaps some exaggeration; but there is no doubt that the diplomas of Dr. Buchanan must reach a very high number. In his confession he names the professors who, for a given price signed the diplomas, and the consulates which legalized those intended for abroad, mentioning among them that of Spain.

"The establishments which Dr. Buchanan directed, or those which he has invented, and whose diplomas have, therefore, no value, are the following:

"The Eclectic Medical College of Pennsylvania.

"The American University of Philadelphia.

"The Philadelphia University of Medicine and Surgery.

"The Livingston University of America.

"The Pennsylvania Medical University.

"The Philadelphia College of Medicine.

"I do not believe that there can be many of these diplomas in Spain, but it is very likely that there exists a considerable number in the Island of Cuba, for which reason I have brought the foregoing to the knowledge of the Governor-General of that Island, and at the same time I have directed the Consul of Spain at Philadelphia to examine the books of the Consulate, and to send me a list of the diplomas which appear to have originated from some of the said establishments, and which may have been legalized in the Consulate.

"I have thought it my duty to make known to your Excellency a fraud which may be so injurious to public health, in case the Gov-



ernment of his Majesty deem it advisable to take some steps conducive to the suppression of said illegitimate diplomas in Spain."

By royal order I transmit the above to your Excellency for your information, and in order that you may call the attention of whom it may concern to the necessity of examining the diplomas which may be issued by the said institutions. In view of the foregoing communication, his Majesty, the King, has been pleased to direct that no authorization be granted to practice in Spain with diplomas from the said establishments, and to declare null and void those which may have been granted by the Board of Examiners at a time when these were authorized to issue professional diplomas. By royal order I make this known to your Excellency for your information, and for such action as you may deem necessary. God preserve you for many years.

ALBAREDA,

The Director-General of Public Instruction.

—*Philadelphia Record*.

PARALYSIS AFTER EXTRACTION OF A TOOTH.—Mr. Henry Sewill related a case in which paralysis of the parts supplied by the inferior dental nerve followed the extraction of a lower wisdom-tooth. There was complete anesthesia of the skin of the lip up to the middle line in front, and all the teeth on that side were completely insensitve. He had ventured to give an encouraging prognosis as regards the restoration of sensation. Mr. Coleman mentioned a similar case, in which sensation had remained greatly impaired even after the lapse of two years. Mr. Browne-Mason, of Exeter, said that, in a case which had occurred in his own practice, the paralysis had passed off in a few weeks. The President remarked that it was important that such cases should be reported, since they were sometimes made the ground of an accusation of unskillful treatment.—*Reports Odontological Society of Great Britain, in British Medical Journal*.

## HINTS AND QUERIES.

"He that questioneth much shall learn much."—BACON.

CORRESPONDENTS desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

WILL some one tell me the cause of discoloration and the proper treatment in the following case?

A lady patient, about thirty years of age, of lymphatic temperament, presented with the right superior central incisor of a very deep and healthy yellow color, it having commenced to discolor about four years since. She stated that the tooth had never received a blow, or been sensitive to pressure, or the cause of any pain or trouble, and there was no appearance of caries. It is firm in the socket, and to all appearance is a healthy, living tooth. The gums present a natural appearance, and there is no trace of abscess. The patient has always taken special care of her teeth, and they are all clean and white except this. The very great contrast in color amounts to a disfiguration.—T. K.

THE  
DENTAL COSMOS.

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No. 11

ORIGINAL COMMUNICATIONS.

REPLANTATION.

BY W. FINLEY THOMPSON, M.D., D.D.S.

Read before Section XII. of the International Medical Congress, August 4, 1881.

The subject of replanting teeth, although frequently brought before the dental and medical professions, does not seem to have been thoroughly investigated by either body, yet it is one in which, of late, so many instances of treatment, successful or otherwise, have been recorded, that its discussion is not only permissible, but even necessary; and, as the judgment of this Congress will undoubtedly bring it into more prominent favor, or tend to cast it into oblivion, I submit the following questions, hoping that they may bring out a full expression concerning it:

I. Shall the replanting of teeth, under any circumstances, be a recognized operation in dentistry? and, if so, under what pathological conditions should it be employed?

II. What advantages, in contradistinction to the disadvantages, may be claimed for replanting? Also, what percentage of cases are successful?

Before entering upon the practical bearings of the subject, it would be well, perhaps, to briefly consider the structure of the pericementum, as upon the condition of this tissue replantation is wholly dependent for its success. The diagrams before you are not intended to show all the microscopical features of interest in the pericementum, though, with the exception of Fig. 1 they have been carefully made from specimens, and may serve to explain some portions of my paper.

Fig. 1 is only intended to demonstrate the relationship of the pericementum to its contiguous parts. A, enamel; B, dentine; C, pulp; D, papillæ of gum; E, blood-vessels of pericementum; F, bone of alveolus. This diagram, I think, clearly shows the dependency of the periodontal membrane upon its nutrient structures to perfectly perform all the functions for which it is intended.

Fig. 1.

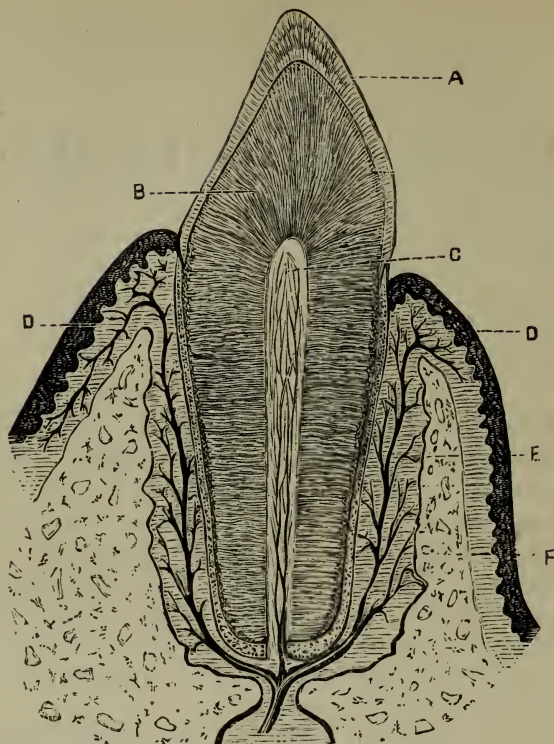


Fig. 2 is a representation of a transverse section of the jaw and tooth of a cat. The bone of the alveolus is shown at A, the cementum at C, and the pericementum at B, very highly magnified. The protoplasmic bodies, or masses of living matter, are seen to be pretty generally distributed throughout the tissues; the transverse fibers are also seen, and I have endeavored to represent their connection with the bony structure of the alveolus and with the cementum.

Fig. 3 represents a portion of a longitudinal section of human pericementum, showing at *a*, a small artery, with the muscular fiber cells of its wall, and also at *b*, a vaso-motor nerve-fiber accompanying it. The artery breaks up into capillaries, and a small vein is seen running into the bone at *d*. The fibrous tissue is well shown, many of the fibers being somewhat spindle-shaped. Bundles of fine fibers run along with the vessels into the bone. The protoplasmic bodies, as in the preceding figure, are dark and granular.

The periodontal membrane is an organized tissue which must be considered under two aspects—its relation to the vascular alveoli, and to the non-vascular cementum of the teeth. Its office, however,



Fig. 2.



Fig. 3.



is similar under either aspect, as it acts as a periosteum or nutrient membrane to both, though modified in its action, and even in its texture, to a degree commensurate with the difference existing between the compact cementum and the soft cancellated alveolar tissue. Owing to the intimate relation of the periodontal membrane to these two structures, it may, in the absence of pulp-irritation, be considered the important factor in lesions connected with the teeth. It is chiefly composed of white fibrous connective tissue, and has a rich nerve and blood supply, while nucleated masses of protoplasm are to be found in every part. The wavy character of the fibers is more pronounced when seen in longitudinal than in transverse section. Their general course is oblique from the bony alveolus to the cementum, without break or interruption. According to Waldeyer, the nerve supply is abundant. The larger blood-vessels ramify in a general manner; those from the gum and alveolar surface also anastomose in its substance. The smaller masses of protoplasm are chiefly connective-tissue corpuscles, while those near the bone and cementum form the osteoblasts. It is to the vitality and function of these histological elements in particular that we must have the greatest regard in considering or treating any pathological condition of the dental pericementum.

Reverting to the first question, "Shall the replanting of teeth, under any circumstances, be a recognized operation in dentistry?" the recorded instances of success in replanting have perhaps been looked upon as evidences of a certain power in nature not practically available, and consequently classed with other curious anomalies in the transposition of tissues. Want of success, through operating under incompatible conditions, has discouraged some from following to its conclusion a method which certainly has, in some instances, been practiced advantageously. These remarks must not be misunderstood; for I contend that the system of replanting should not be introduced in practice, save in severe and otherwise hopeless cases, and it is to these alone reference is now made.

In regard to the physiological action in the reunion of the tooth with the alveolus, we can only reason from analogy. The existence of a perfect reticulum of connective tissue with fibers and protoplasmic cells is, however, abundantly proved. In fact, the osteoblasts accumulate in such numbers on the surface of the cementum, that, in certain inflammatory disorders, they act antagonistically, removing part of the cement, producing characteristic striæ and depressions. The office of protoplasm in the reparation of severed tissues is so well known that I need only call attention to the existence of this germinal matter in the pericementum, to at once establish, *primâ facie*, the probability of the reunion of a tooth



with its socket, through the intervention of the alveolo-periodontal membrane. As we see, by an examination of the pericementum, there are, in the healthy condition of the tooth, immense numbers of masses of living matter in connection with the various parts entering into its composition. In health, these germs go through their proper changes and perform their proper functions. In diseased conditions, or in any departure from the healthy state, these protoplasmic bodies are also the principal agents; and, in such departures from the healthy state, they are excited to action by excessive supply of pabulum, which causes each individual mass of living matter to live faster than it should, *i.e.*, it takes up and converts into living matter like itself more pabulum than it does in the normal condition; it becomes enlarged, it divides and subdivides, and multiplies to such a degree that, in the place of the healthy tissue, we have a pus-formation. The protoplasmic bodies in the blood—or white blood-corpuscles—also actively assist in the inflammatory process.

Cases are recorded of teeth that have been successfully replanted without pericementum upon them. The means of union in such cases I shall not now discuss; yet it may not be without interest if I cite a case which lately came under my care, where the return of the tooth to its socket was, from various causes, delayed for twenty-five hours. In this interval, instead of being kept in a solution of salt and water, it was incased in bibulous paper moistened with carbolized water. The tooth, after being returned to its socket, appeared for a time to progress favorably; but was, notwithstanding, ultimately lost. It is a question whether the lack of vital power was not in consequence of too long an interval between extraction and replanting, or whether the carbolized water destroyed the protoplasmic germs which were to, in part, restore vascular circulation between the alveolus and the pericementum. I infer that, in the necrosed condition of the pericementum, which was not tolerated by the plastic effusion from the alveolus, sloughing resulted, instead of any fibrous connection with the cementum.

There is, even in successful cases, great difference in the stability of replanted teeth. In some, considerable mobility exists, indicating a lax fibrous attachment; this sometimes occurs in undrained teeth, caused, no doubt, by the retention of septic matter, or the effusion of inflammatory products into the connective tissue. In others the fixed condition of the tooth suggests ankylosis. These latter cases are usually found where drainage has been provided for, thus permitting egress of the morbid accumulations from suppuration, as well as the sequelæ of organizing inflammation.

The periodontal membrane is affected by the same diseases as



periosteum in general, and its diseases are usually expressed in the terms of inflammation. This inflammation may arise from traumatic or idiopathic causes; in many cases from a diseased pulp, or in the pericementum of stumps which, from their partaking so much of the character of sequestra, are always subject to expulsive efforts. The character, progress, and duration of periodontitis will influence its treatment. In the incipient acute stages, palliative measures and antiphlogistic remedies will sometimes arrest the morbid action of the blood upon the alveolar dental tissues; but, in chronic periodontitis, any means employed must be with a view to the removal of all depositions of a hyperplastic or purulent nature. The acute stage may terminate by resolution, in which case the uneasiness of the tooth soon passes away; or it may become suppurative, leading to alveolar abscess, or, if chronic, to a purulent disintegration of the pericementum. Then we have to consider inflammation as connected with reorganization, on which the success of replantation, theoretically at least, depends.

Whether the inflammation be acute or chronic, the practice of replantation demands the removal of all the disintegrated pericementum, the destruction of the sac at the apex of the root, and the careful polishing of the cementum where the osteoblasts, from inflammatory influence, have reversed their function and begun to re-absorb the osseous structure which they originally formed. This process may vary in degree from merely causing microscopic pits in, and prominences on, the cementum, to the dissolution of that tissue, and the ultimate wasting of the root of the tooth. It was this condition which suggested to me a possible advantage from capping. Of the subject of capping I shall shortly treat.

II. What advantages, in contradistinction to the disadvantages, may be claimed for replanting? Also, what percentage of cases are successful?

Those who have treated chronic alveolar abscess must, at times, have experienced the uncertainty of their efforts. Day after day, perhaps for weeks, and even months, patients are subjected to the inconvenience of almost daily attendance upon their dentists, with but doubtful benefit, the final result being, perhaps, only the temporary retention of the tooth. Shall we not consider such cases open for the adoption of any means promising relief? Then, again, there may be conditions under which the time required cannot be devoted to the case, as often happens when patients come from a distance. If an operation calculated to secure a valuable organ can be performed at a single sitting, shall we not deem it a justifiable procedure?

The operation of replanting is one which, from its very nature,

must be brought to a quick conclusion. Although, between the intervals of extracting and restoring the tooth to its socket, several hours may elapse, no unnecessary time should be wasted in its return.

It may be alleged that the severance of the contiguous tissues and the disruption of the nutrient vessels is of such a character as to preclude solid reunion of the cementum, the pericementum and the gum and alveolus. That reunion may partake of the nature of a "seamed scar," and therefore be so far incomplete, I shall not attempt to deny; but that it is sufficient to continue the low vitality required to insure the retention of the tooth is now fairly well established by the lapse of years in cases of replanted teeth which are apparently sound and useful to this day. As an instance: A patient of the late Mr. Edwin Sercombe's, who came under my care for general treatment of the mouth, gave me the history of a second inferior bicuspid, replanted some ten years before by that gentleman. The tooth was not discolored, and it still had every appearance of being alive. A slight retrocession of the gum and alveolus had taken place, but not to such an extent as to cause any inconvenience. Numerous other equally successful cases have been recorded.

Restoration of the tooth can also be made where ugly forms of decay extend under the gum to almost inaccessible positions, with a degree of perfection limited only by the skill of the operator, as the manipulation is not then dependent on the endurance of the patient, whose irritability ceases to be an element in the difficulties of the operation. This advantage, however, should in no way bias a practitioner in the treatment of any case.

Extraction, performed under the influence of nitrous oxide is, of course, painless; and when the manipulation of the tooth is completed, gas may again be called into requisition for its readjustment, the only part of the operation which can cause any further acute pain. Once the tooth is established in position and carefully adjusted in respect to its occluding surfaces, rarely more than tenderness and uneasiness of a few days' duration are experienced.

Having viewed one side of the question, I shall proceed to consider the disadvantages that may be urged against replantation.

We have to combat with the antagonism which arises from the mere mention of an operation which is repugnant from its peculiar nature to the feelings of the patient. From the limited general information, or, perhaps, lack of personal experience in connection with the subject, the results recorded are undoubtedly, at the present time, skeptically received by the profession.

The nutrient structural attachment being ruptured, time will be required to establish reunion of the parts. For several days the

tooth must be an object of constant care by the patient, who will occasionally be annoyed by its occlusion with the opposing teeth. Although uneasiness may be experienced as an accompaniment to the operation, it is doubtful whether the actual pain is in excess of that caused by local applications.

The next restraining influence in the practice of replanting is the uncertainty and known danger of extraction; this is hemmed in by circumstances quite beyond control. The shape of the alveolus and of the teeth would, in many instances, insure a favorable prognosis of extraction, yet in some cases it is impossible to accurately predict the result, for the root may be so distorted as to cause fracture of the alveolus or of the root itself, while this same distortion may prevent the return of the organ to its socket.

In considering "What percentage of cases are successful?" I shall first briefly describe the system of treatment which I have adopted. In cases of chronic abscess, and where the apex of the root has lost its pericementum, the denuded portion of the root is excised, and restored with a gold cap, the object being, if possible, to prevent absorption. To remove inflammatory products, instead of drilling through the alveolus, or cutting a gutter along the roots, a tube is fixed in the pulp-canal, extending from the apex of the root to the grinding-surface. From my experience, I do not now ascribe much of the success that I have had to the cap; but the tubing, inasmuch as it permits of drainage, I deem important. As to how far the cap has accomplished the object for which it was intended, I am unable at present to give any reliable information, simply from the fact that, in every case where the tooth has been retained for a period of over fifteen days, I have *never had an opportunity of again seeing it*. That this foreign substance has been tolerated by the living tissues is a well-authenticated fact, the physiological effects of which must for a time rest in abeyance.

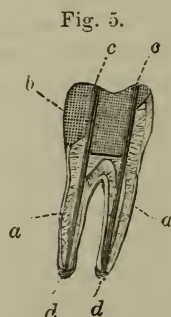
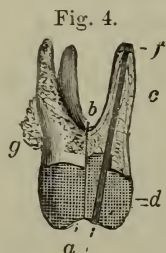


Fig. 4 shows an upper molar, with the palatal root in longitudinal section. At *a* the drainage-tube extending from the gold cap *f*, at the apex of the root, through the gold filling of the crown *d*.



Fig. 5 represents a section of a lower molar, with each root capped and tubed; *d d*, gold caps; *c c*, tubes; *b*, gold filling of crown.

I have spoken of the difficulty in some instances of returning teeth to their sockets. A case illustrative of this came under my care some two years since, the tooth being a superior first molar, with the palatal root standing at an angle of about  $35^{\circ}$ . The tooth having for a long time been affected with chronic abscess, and the lady being non-resident of London, with only a limited time which could be devoted to treatment, I decided to extract, fill, and replant it. The tooth was removed at twelve o'clock and returned at 7 p.m. of the same day. Three-fourths of the crown had been destroyed by decay, and the post-aproximal aspect was broken down far below the margin of the gum. This was undoubtedly a case that I should have failed in again restoring to the mouth had it not been for the kindness of Mr. Woodhouse Braine, who rendered me valuable assistance in keeping the patient under the influence of nitrous oxide both while the tooth was taken out and while it was returned to its socket. I make particular mention of the gas in this case because I was not able to return the tooth to its place until I had used almost the same force that I did in extracting it. The lady called some time afterward, and, having occasion to take nitrous oxide again, it gave Mr. Braine an opportunity to examine the condition of the tooth. The lady stated that it had done the best of service; and, after the first few days, had occasioned her no discomfort. In this case, the tooth seems fixed—a condition that I am not prepared to say is an advantage.

During a visit of Dr. Wm. N. Morrison to London, replantation was a subject of considerable discussion between him and myself. I was then endeavoring to investigate the practical benefits (if any) that might be obtained by this method; and my conclusions are drawn from results extending over a period of three years. For the first two years I made it a special point to obtain as many cases as possible. During the last year, however, I have only replanted four teeth. My experiments have been made principally upon persons in the lower walks of life. Many cases I have completely lost sight of, so that my failures may not be all recorded.

Number of teeth replanted (estimated)	80
Lost, as far as known	8

The losses were as follows:

From non-union	5
Imperfect union; three months' retention	1
Abscess recurring	2
Lost cases, as far as known	8

This gives a percentage of success of 90. Of the eight lost, five

were not tubed. Of the remaining three, which were tubed, one abscessed again, and the other two were lost from non-union. Of the number of teeth replanted, I am not able to state the exact proportion tubed, but I estimate it as something over fifty per cent.

During the last twelve months, the number of teeth replanted by me has been:

In private practice . . . . .	1
Hospital practice . . . . .	3
	<hr/> 4

I now wish my own position to be distinctly understood. All my cases were undertaken for two reasons. First, because the teeth were so badly diseased that satisfactory treatment in the mouth was exceedingly doubtful; second, that I might, from my own experience, be able to record my failures and successes in replantation. Therefore, the opinion I gave at the early part of this paper I here reiterate, viz., that the system of replanting should only be adopted in severe and otherwise hopeless cases. The percentage of failures, as given by Dr. Magitot and by myself, at once shows that, in treatment of chronic abscess, even replantation is not to be always depended upon.

Before closing, I desire to call attention to the subject of transplantation of tissues; and, through the kindness of Mr. C. Macnamara, Surgeon Westminster Hospital, I am permitted to refer to a case which has been of considerable interest to me. Mr. Macnamara seems to have been influenced in the treatment adopted by what he had seen in connection with teeth replanted. It is, so far as I know, the second instance only in which transplanting of bone has been effected of the same nature and of so extensive a character; and, thinking that it might possess features of interest to this Congress, I have, with the consent of Mr. Macnamara, arranged for as many to see the case as would like to do so. The clinical notes handed to me are as follows:

"S. W., aged 6, was admitted into the Westminster Hospital, August 10, 1880, suffering from epiphysitis of the upper extremity of the right tibia. The inflammation extended to, and destroyed, the shaft of the bone. Mr. Macnamara consequently, on June 2, 1881, removed the dead bone, that is, the entire shaft of the tibia, the upper and lower epiphyses were left in situ, and as much of the periosteum as could be saved. The wound healed, but no new bone formed, so that the child's leg was useless.

"On May 21, 1881, Mr. Macnamara determined, if possible, to plant small fragments of bone in the situation of the lost tibia, in the hope that they would produce a new bone. Having a case of amputation of the foot for deformity, the bones of the tarsus were,

immediately after its separation from the body, divided into small pieces, and an incision having been made along the front of S. W.'s leg, from the upper to the lower epiphysis, fragments of bone were placed along the line formerly occupied by the tibia; the edges of the wound were then brought together. The operation was done under the carbolic spray and with antiseptic dressings.

"Two days after the operation, on removing the dressings, there was found to be some tension about the wound, and the sutures were consequently divided and taken away. On the third day, several of the fragments of bone planted in this child's leg were seen to be vascular and attached to surrounding living structures; they have since grown, and are now covered in by granulations. So far as can be ascertained at present, there seems good hope of sufficient osseous tissue remaining and growing in the leg to produce a new tibia."

In sub-periosteal operations, the physiological changes that take place in the membrane to elaborate new bone seem almost incomprehensible. This reproductive power was strikingly evinced in another case, the particulars of which have been kindly furnished to me by Mr. Macnamara:

"A. L. was admitted into Westminster Hospital under my care on March 26, 1879, with acute epiphysitis of the upper extremity of the right tibia, and consequent septicemia, from which the lad remained in a most critical condition for nearly a month. He then got so far well as to enable me either to amputate the limb or to take away the shaft of the tibia without removing the periosteum. I determined on the latter operation, and the section of the shaft of the tibia removed is exhibited in the museum of the International Medical Congress, No. 19. The boy recovered well from the operation; and, from the periosteum I left in his leg, not only has a new tibia grown, but the bone is larger than we know what we do with. The patient has a good knee and ankle-joint, and can walk about perfectly well."

These two cases possess many points of interest which bear upon the subject of replantation of teeth. One question, at least, I should wish discussed here is, What points of analogy or of difference are there between the nature of repair and of bone-formation in such instances as those cited by Mr. Macnamara, and the repair and re-attachment which takes place between the bone of the alveolus and the cementum of a replanted tooth?

The vitality of the periosteum, and the reparative action it is shown to be the seat of, together with the pathological and even distinctive functions it is capable of performing, renders a more perfect knowledge of the structure of that tissue, in its several positions and relations, a matter of the greatest importance to prevent error even in such operations as the replantation of teeth.



## REGULATION OF TEETH MADE EASY BY THE POSITIVE SYSTEM.

BY J. N. FARRAR, M.D., D.D.S., NEW YORK CITY.

(Continued from page 350.)

## No. XVI.

## JACK-SCREWS AND THEIR ANCHORAGES.

WE will now direct our attention to a class of regulating apparatus which are more positive in action and more reliable, and especially adapted for moving teeth that are so inclined as to render it impossible to use devices depending simply upon impingement.

This class is constructed upon the principle of jack-screws; but while we so designate them, our remarks will be more especially directed to the various modes of securing them to teeth so that they will remain firmly in place. Beginning with the simpler methods, we propose to gradually lead the reader to those which are more complicated, but exceedingly interesting and useful.

It has been said in a former paper that the points of spindle jack-screws may sometimes be advantageously set into cavities, formed either artificially or by decay. Although we do not advocate the formation of artificial pits except in cases of necessity, and have so written, yet it will not be amiss to explain again, for some think it wrong to even hint such a procedure for fear that the younger members of the profession may be led into error.

In regulating teeth there are occasionally exigencies in which the only "way out" is by adopting the lesser of two evils; to advise less is cowardice, to attempt more is to fail. While a pit may sometimes be not only needless, but in some small degree unsightly when filled, the judicious formation of one, considering the advantages to be gained, may occasionally be excellent practice. Some people think that an artificial pit is a starting-point for rapid decay. Apprehension on this point, however, has little or no foundation in fact. A small cavity, formed by decay, in a well-developed tooth, when properly excavated and filled, is considered almost absolutely safe from further decay; but, if that cavity be excavated to the satisfaction of the most critical operator, and then be left open a few months, decay will be found to have progressed more or less rapidly. On the other hand, if a small cavity be artificially made in sound tooth-structure, and be allowed to remain open, decay will not occur for a much longer period, depending somewhat upon the quality of the tooth and the habits of the patient. I have known such pits to remain open from one to three years without the least apparent injury—showing that there need be but little fear of decay resulting from artificial pits, properly filled soon after having fulfilled their offices.

These facts also show beyond doubt that, in the case of a cavity formed by decay, although excavated so thoroughly that, apparently, nothing but sound tissue is left, there does remain for some distance beyond some feature of a pathological nature which is not present around pits artificially made, unless exposed for a long time. Esthetically speaking (and this is about the only tangible objection), it is true that there will be a filling that may or may not be visible, but should it ever be necessary to make a pit on the visible surface it will be so small that it cannot be much of a disfiguration, certainly not one worthy of consideration.

A mouthful of fillings in natural cavities alarms no one! Why should a single one of the size of a small pin head? It remains then to weigh the advantages against the disadvantages. Some operators are deterred from properly preparing cavities, because patients may think more tooth-tissue is removed than is necessary. I never knew harm to arise from a pit that was bored with common-sense.

Fig. 103 represents a set of cylindrical spindle-pointed jack-screws, varying from one-half to two inches in length, which may be used diagonally or transversely across the mouth.

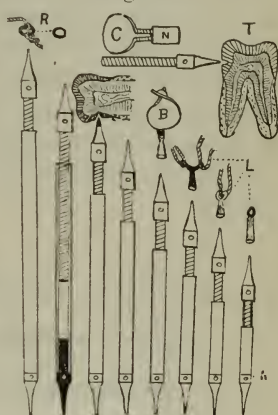
Their slender extremities may sometimes rest in pits or cavities in the teeth, but generally they can be set into some little device tied to the teeth. These may differ in construction and may be a simple ring (R) fastened to the lingual surface of the tooth by means of a string, or may be in the form of a socket (L) made by soldering to this ring a short piece of small gold tubing. These sockets, generally most

convenient when about one-fourth of an inch in length, may be used the same as the ring, by inserting the point of the jack-screw into the eye or ring in the earlier stages of the operation, and then into the tubing itself during the later stages, which practically avoids changing the screw for a longer one.

To firmly secure jack-screws to upper front teeth has always been considered very difficult, and by some an impossibility, because of the inclination of the lingual surfaces, but with these little rings and sockets properly tied with strings the difficulty may be overcome, and one may be enabled to make great use of the principle of the jack-screw.

The upper portion of Fig. 103 represents various forms of this variety as they appear attached to strings.

Fig. 103.



Another device to accomplish the same object, is shown by (C) Fig. 103, and acts upon the principle of a clamp. It is made of thin plate soldered to a split screw, which is tightened upon the tooth by means of a ferrule-nut (N). To manufacture this screw take two pieces of half-round wire, solder the flat surfaces together with coarse solder, then cut the thread, and separate the screw by remelting the solder.

To use this device, clamp it upon the tooth and adjust the spindle-point of the jack-screw in a hole made in the ferrule-nut, or in a ring or ferrule soldered to some portion of the device.

To prevent a spindle jack-screw from revolving while being operated it should be held fast by a second lever-key inserted into a hole in the opposite end. This hole may also be used for tying the instrument to teeth to prevent its being swallowed if accidentally loosened.

The mechanisms thus far described, although practicable under favorable circumstances, are, however, sometimes more or less rickety and uncertain, requiring careful management and close watching. In view of this it seems proper, in order to completeness of the subject, that a few of the more positive although somewhat more expensive varieties in the form of simple and compound yoke jack-screws be explained. These, if properly made and applied, will remain firm, regardless of tongue or food, until their work is finished.

Figs. 104, 105, 106 illustrate three of the simpler forms of this variety.

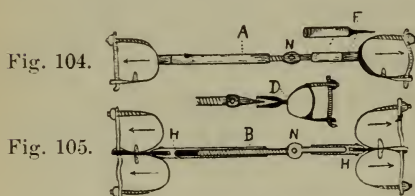


Fig. 104.

Fig. 105.

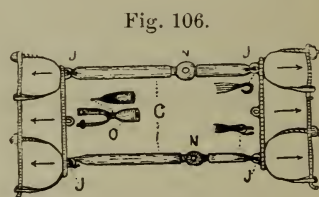


Fig. 106.

Fig. 104 represents a single jack-screw, with two single yokes for moving two teeth.

Fig. 105 illustrates a single jack-screw, with a double yoke at each end, which is used for moving four teeth.

Fig. 106 represents a double jack-screw, with two triple yokes, used for moving six teeth.

The diagrams so clearly show the different parts and their connections and application, that they need but little explanation.

The jack-screws A, B, C, like those illustrated by Fig. 103, are of cylindrical form, and easily made of threaded tube and screw-cut wire, afterwards nickel-plated. (It is not necessary to have a reverse thread on one end of these screws.) A nut, through which



a hole is drilled for the insertion of a lever-key, is then soldered in position as shown. (See sectional view, Fig. 105.)

The yoke-bands are strongest and best made of plate rolled from wire, (as explained in No. VIII., Feb., 1879.) The methods of joining the yokes to the jack-screws are various. They may be connected by a thin flexible piece of plate (F, Fig. 104), soldered together, or by a rivet-joint (H, Fig. 105), by staples or hooks (J, J, Fig. 106), or any other form of hinge, or they may be made detachable, and simply connected with the teeth by sockets (D, Figs. 104; O, 106). The joint obtained by these connections is very desirable for free motion and change in the angle of the moving teeth.

These jack-screws are not only of inestimable value when teeth are so tapering and adversely inclined as to render the other devices impracticable, but they are trusty in their office at all times.

The principle caution in adjusting these yoke-fixtures is to be sure that they fit so firmly that they cannot slip upon and injure the gum. Sometimes this may be avoided, when cavities exist, by filling them and the spaces between the teeth with some plastic material (Fig. 99.) Occasionally a string tied over the sulcus of the tooth, as described, will be sufficient, but a much better plan is to solder ear-lugs upon some portion of the yoke so that they may be bent over the grinding-surface of the tooth (Fig. 104), or by making use of the principle of the bail portion of the gum guard-ring (D, Fig. 104), as described in No. XV., July, 1881.

(To be continued.)

## THE REGULATION OF TEETH BY DIRECT PRESSURE.

BY EUGENE S. TALBOT, M.D., D.D.S., CHICAGO, ILL.

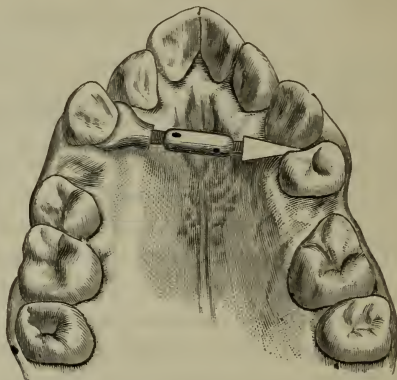
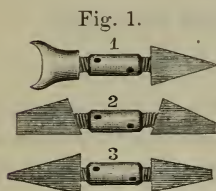
I have read with interest Dr. Farrar's papers on "the Regulation of Teeth made easy by the Positive System," and have been benefited by making practical use of some of his ideas on this subject. As one class of remedies will not answer every ailment, nor one apparatus suit all cases, so no one rule can be made for the regulation of all teeth. The different circumstances of the case must be considered, and the ingenuity of the operator be exerted to obtain the desired effect. A case in my practice was very obstinate until I resorted to a special apparatus which I devised for the case. It may assist some fellow-practitioner in similar cases if I relate the particulars.

The patient, a school-teacher, twenty-seven years old, called at my office January 9, 1879. Upon examination I found, besides many cavities in the teeth, a marked deformity of the face, caused by a

narrow, contracted arch, and a peculiar way of closing the teeth, which produced a concavity of the left and a convexity of the right cheek—the face presenting a crescent shape. These peculiar disarrangements interfered greatly with her articulation, and rendered it difficult for her to speak distinctly, much to her own and her pupils' annoyance. I also found the central incisor protruding so far that she was unable to close her lips. I suggested the possibility of correcting these deformities, although her age would increase the difficulties of the operation. She gladly took the chances, and put herself under my treatment. I removed a badly-decayed first bicuspid on the right, and a sound second bicuspid on the left side, as it was located considerably inside the arch. Several appliances were made, but in each case the posterior teeth were drawn towards the anterior part of the mouth. I found it necessary to move each tooth separately, and by direct pressure; and discovered also that the screw and wedge exerted the greatest force by obtaining a fixed point, and that they could thereby be applied directly.

A rubber plate was fitted to the roof of the mouth and about the teeth which were to remain stationary. The edge was beveled where the screw was applied, to prevent its being forced against the gum. I secured a jack-screw of the proper length firmly to the canine upon the right side, allowing it to come in contact with the tooth I wished to move—the bicuspid of the opposite side. When

Fig. 2.



this was forced laterally sufficiently, I removed the nut on the end of the screw and replaced it with a wedge, which was inserted between the bicuspid and the canine. The canine being firm and inflammation having been already produced around the bicuspid, it yielded readily to the powerful pressure of the screw and wedge. When this had proceeded as far as possible, the wedge was removed and a thicker one substituted. As soon as the tooth reached the molar, it

was secured to it by ligatures and so held in place. I fastened my jack-screws firmly to the canines and forced them laterally until inflammation set in. Wedges were put upon either end of the screw, inserting them between the canines and lateral incisors. The laterals being solid, acted as fulcrums, and the canines were easily forced into place. These were then fastened by ligatures. To move the lateral incisors I employed a short screw with wedges in which holes had been drilled. To each central I tied a linen thread, carrying it around the lateral, over the end of the wedge on the screw, and passing it through the holes, tied it fast. By turning the screw the laterals were not only forced outward, but were

Fig. 3.

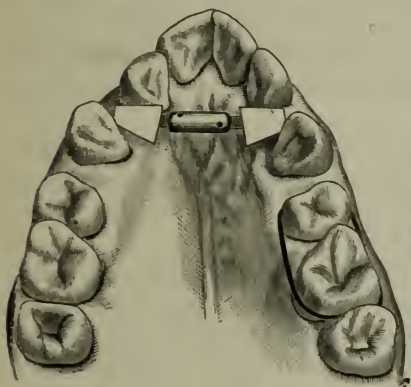
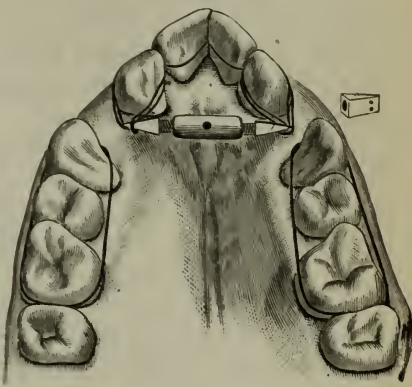


Fig. 4.



rotated in their sockets. When this was accomplished, I fitted a plate to retain the teeth in place and also to draw the centrals back into the arch. This was done by running a piece of gold wire across the labial surfaces of the centrals, from which a rubber band was carried posteriorly to a loop in the rubber plate. As soon as they reached the proper position, another plate was inserted with a gold band passing over the outside of the teeth to hold them in place.

The patient continued her school duties throughout the entire treatment, and when the plate was removed she could articulate distinctly, and was able to close her lips. The contour of the face was much improved.

I have used the screw and wedge successfully in other cases, and am satisfied they greatly assist in these operations. The wedges should be of various widths, and the screw inserted at different angles to the incline. This makes it possible to carry a tooth in any direction, regardless of the position of a fixed point at the other end of the screw.



## CONCERNING DENTAL COLLEGES.

BY JOS. RICHARDSON, M.D., D.D.S., TERRE HAUTE, IND.

UNDER the above caption, the editor of the *Dental Register* (July number) quotes the following resolution adopted by the American Dental Association in 1880:

"*Resolved*, That in order to secure representation in this association, dental colleges must, subsequent to October 1, 1881, require all students entering therein to take two full courses of lectures previous to coming forward for examination and graduation, and must also state these conditions in their next annual announcement."

Commenting on this resolution, the editor says:

"This would seem to be definite, and yet some student writes every few days that he is promised graduation upon attending one course of lectures by some of our reputable dental colleges. Now, do some proposed students falsify or prevaricate, or are there some of our colleges that propose to ignore or disregard the action of the American Dental Association?"

We will answer. The student or students referred to falsified. No one, perhaps, knows better than the editor that there is not a *reputable* dental college in the country that "promises graduation upon attending one course of lectures."

But this was probably only a convenient and ingenious pretext adopted by our old and valued friend, the editor, for giving the Indiana Dental College a slap in the face. And when he said, further on, that he did not know whether all the colleges had conformed to the requirements of the resolution, we naturally wondered if this confession were altogether ingenuous, for it was difficult to believe that one so thoroughly interested in the educational interests of his profession could so long remain ignorant of the educational requirements of a neighboring school, and especially when such requirements had been explicitly declared in each successive annual announcement, and published in several, if not all, of the leading dental journals, since its organization three years ago.

But this school does not "promise graduation upon attending one course of lectures." It does, however, provide that the student *may* take the degree at the close of a single session if found worthy to receive it on examination—qualification, and not a multiplication of lecture courses constituting the test of worthiness.

It is not our purpose at this time to discuss this policy on its merits. There will be time enough for that when it is assailed by argument rather than by mere assumption. When it is made apparent by dispassionate reasoning that the policy is at variance with the best interests of the profession, the faculty of the Indiana Dental College, we feel assured, will not be slow to abandon it.

The most extraordinary and gratuitous assumption of the editorial referred to, however, is the following:

"The resolution embodies the belief and conviction of every true and intelligent friend of the profession in this country."

Now, we submit whether the editor, in this declaration, has not permitted his zeal in behalf of a personal conviction to outstrip and override his sense of professional justice and courtesy. If it be true that the resolution embodies the belief and conviction of every true and intelligent friend of the profession, then the converse of this proposition is equally true, namely, that all who dissent from the resolution are neither true nor intelligent friends of the profession. No other interpretation is admissible.

We repeat, therefore, that this assumption is eminently unjust and discourteous (not intentionally so, we trust and believe), because it explicitly challenges the honesty and intelligence of a large body of men in the profession whose loyalty to its interests has never before been questioned, and whose professional culture will probably compare favorably with that of those who differ with them touching this much mooted and yet unsolved problem of dental education.

The faculty with which the writer is associated, in admitting students to examination for the degree after attendance upon a single course of lectures, is antagonized by the American Dental Association for reasons growing out of the simple assertion on the part of the former of the right of opinion on a special phase of educational policy. The antagonism involves simply a difference of opinion, honestly entertained, it may be presumed, by all parties concerned. For this assertion of the right of opinion and adherence to a conviction of the justice and equity of the principle involved in the special feature of the school referred to, the faculty, by implication, is characterized as wanting in loyalty and intelligence on the one hand, and on the other is ostracized professionally by the edict of the American Dental Association.

They are, however, not alone under the ban of this august body. Though not specifically disqualified for membership in the American Dental Association by the letter of its requirements, there is a semi-national organization, second only in numbers to the former, whom the spirit of the offensive resolution impliedly and constructively anathematizes. The indorser is equally liable at law with the maker of a note. It is not in accordance with the "eternal fitness of things" that he who transgresses the letter of a law should be accounted guilty and punished, while another is permitted to escape who violates its spirit. This is not equity, and equity is the soul of law. Let, then, the Southern Dental Association be brought to the bar of the American Dental Association and reprimanded. It would

be at least a show of judicial virtue and fairness to punish, in this mild form, an organization that has presumed to violate the spirit of its resolution by an outright and emphatic indorsement and approval of a policy the practical application of which by the faculty of the Indiana school has cost that body the privilege of fellowship with the more favored members of the American Dental Association.

We beg that the editor of the *Dental Register*, on reading the following resolution, unanimously passed at a recent session of the Southern Dental Association, will qualify, somewhat, his hasty and rather over-confident assertion that the *other* resolution "embodies the belief and conviction of every true and intelligent friend of the profession." It will never do to stigmatize the members of this body after that fashion. They will not suffer by comparison with the members of the American Dental Association, either in point of professional character or attainments. But to the resolution:

"*Resolved*, That the Southern Dental Association place itself on record as indorsing the principles of education as enunciated by the University of Virginia at its foundation, and of the Johns Hopkins University, of Baltimore, Maryland, of conferring degrees according to merit and previous acquirements; and that we indorse heartily the doctrine that a diploma from a dental college should be awarded to merit, and merit alone, irrespective of the number of years of previous study; and, further, that inasmuch as knowledge is equally valuable whenever and wherever obtained, this association indorses, first, the doctrine of demanding the highest standard of attainments compatible with the present onward march of dentistry, and on the part of applicants for a degree; and, second, the most liberal spirit on the part of those granting diplomas as to the best manner in which said knowledge is obtained; that it is unjust and irrational on the part of any teacher to demand of a pupil the attendance on any prescribed or lengthy course of lectures, if it is proved satisfactorily that the requisite knowledge has been already attained; and that we believe that, in justice to a student of dentistry, as well as of any other study, the privilege of graduating whenever pronounced fit is the true principle."

The refreshing contrast of this resolution, in tone and spirit, with the proscriptive and despotic bull fulminated by the American Dental Association will not escape the attention of the thoughtful and observant reader. There is nothing in the nature of a penal enactment about the former. It is explicit and affirmative in its enunciation of a principle of dental education, but tolerant and catholic in spirit, and has the merit of some show of reason for the faith it expresses. There is no intimation even of the autocratic spirit of dictation and proscription that characterizes the action of the other body. The right of private judgment on a debatable question is tacitly respected and recognized. In these important respects the American Dental Association might sit at the feet of its younger sister and learn modesty, justice, and wisdom.

We are further told by the editor of the *Dental Register* that non-conforming schools cannot consistently apply for membership in the



association, or remain therein as active members, under the operation of its resolution. Applying this to the particular school under consideration, we are curious to know just why the members of its faculty could not consistently apply for membership. Are they not personally and professionally worthy of fellowship? Are they not reputable practitioners, and members of the profession in good standing? Have any of them been charged with, or convicted of, any violation of the code of ethics? Have they been guilty of any unworthy, disreputable, or fraudulent practices in connection with the school? Have they fallen behind all other schools in the character and scope of studies embraced in their curriculum? Are they less exacting and rigid in examinations for the degree than other similar institutions? If they stand approved in all these essential particulars, we may be allowed to press the inquiry, *Why* may not they *consistently* apply for membership in the American Dental Association? That they would be rejected does not affect the pertinency of the inquiry, while the only answer that could be given the several questions above would lay bare the odious intolerance and proscription that excludes them for no other reason than that they have the temerity to differ from the association in opinion on a particular subject about which the profession is pretty equally divided. Could the spirit of intolerance and proscription go further?

We do not question the abstract right of every organized body to prescribe the qualifications of its membership; but when this right implies simply the *power* to do so, no association has the right, strictly speaking, to violate a plain principle of justice and equity in asserting that power.

It was unblushingly asserted in the committee report, which led to the adoption of the resolution in question, "that this association claims the right to exercise a general supervision over the whole subject of dental education." The association indorsed this claim by the adoption of the resolution relating to dental colleges. This was the initial step in the programme of general supervision. It was the beginning of the end of a pernicious and monstrous assumption of a power never delegated to it either expressly or impliedly. We repeat, that if this claim is conceded, the resolution touching the colleges is but the beginning of the end of the work of supervising dental education; for where shall the limits of its exercise or application be fixed? May it not as well extend to private preceptors and subordinate organizations, and assume censorship over the textual and periodical literature of the profession? These are all alike teachers and educators, differing only in methods of instruction, and as properly amenable as the colleges to the supervising control of the association. As there could be no appeal from this

supreme and self-constituted tribunal in educational matters, the association could work its own sweet will without hindrance or sense of responsibility.

But suppose this claim to the right of supervision were conceded, what would be the possible and probable results of its practical application upon the schools of the country? To answer this question intelligently, the character of the American Dental Association must be borne in mind. It is made up from year to year of delegates from subordinate organizations. Its membership is continually changing, by the outgoing and death of old, and the incoming of new members. With this ever-changing membership comes diversity of opinions and convictions. What might be deemed wise at one sitting of the association, and by one set of delegates, might be deemed inconsistent with the interests of the profession at the next, and by a different class of representatives, entertaining opposing views of educational policies. This contingent conflict of individual judgments would entail perpetual modifications of policy in the conduct of schools, over which the association exercised surveillance. We submit it to the dispassionate judgment of every reflecting and candid member of the profession, whether such an order of things would not ultimately be subversive of all harmony, uniformity, and stability in methods of instruction and requirements for graduation in these bodies, and seriously, if not fatally, cripple and embarrass them in the important work of qualifying students under their charge.

The proper and legitimate functions of the American Dental Association are mainly discussional and advisory. Whenever, therefore, it lends itself to the work of legislating and enacting penal resolutions for the government of outside and independent corporate bodies invested by law with specific powers, rights, and duties, it is assuming prerogatives not only foreign to the purposes of its creation, but mischievous and dangerous in their tendencies to encroachment upon the inherent right of every school to determine for itself any educational plan not manifestly inconsistent with the requirements of a thorough professional preparation for practice. The common-sense and enlightened judgment of the profession at large, and not a fractional portion of it represented in the American Dental Association, should be the judge of the sufficiency of that plan for the purposes contemplated.

The legitimate functions of the American Dental Association being, as we have before declared, mainly those relating to the consideration and discussion of matters connected with the theory and practice of dentistry, as well as advisory in all things relating to the interests and welfare of the profession, we suggest that there is ample

scope and opportunity in these directions for the exercise of its best efforts. Great good having been accomplished by it within these limits in the past, it is to be hoped that, in the near future, it will have the good sense to expunge the offensive resolution from its records, cultivate a becoming tolerance of opinion on debatable and unsettled questions of educational methods, and cease to treat reputable members of the profession with an unfriendly discrimination and proscriptive intolerance that does perpetual violence to the essence and spirit of its own code of ethics.

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### CORRECTION.

*To the Editor of the Dental Cosmos:*

DEAR SIR:—My attention has been called to a statement made in the last number (October) of the DENTAL COSMOS, by Dr. J. Foster Flagg, in which he refers (foot of page 521) "to the action of the faculty of the Philadelphia College of Dental Surgery in its attempt to silence Dr. Arthur, and prevent him from teaching 'false doctrines;'" and also page 526:—"At first the statement of Prof. Arthur was treated with contemptuous silence. He had made war single-handed, and in this wise, alone, he continued his demonstrations. At last the schism began to grow; personal animosity was enlisted against him, and not *one* professor—as in the case of Dr. Dwinelle—but *four*, comprising the entire remaining members of the faculty of what was then the leading dental college of the world, were arrayed against him. It was no magazine 'correction' which was brought to bear to crush *him*, but a formal charge of 'false teaching' was made, and he was required to defend his position before the trustees of his institution."

Now, as I was a member of the faculty all the time Dr. Arthur was connected with the college, I therefore must have been one of the four referred to, as there were only five in the faculty, Prof. A. included. I have no recollection of any such action being taken by the "faculty" to silence him. Nor do I recollect of his views on the subject being mentioned in any "faculty meeting;" nor were they ever discussed in the Pennsylvania Association of Dental Surgeons, of which he and all the other members of the faculty were active members at the time.

I can find no minutes of such proceedings in the books of the college or society, both of which I have in my possession. I have also consulted with several intimate friends of Prof. A., none of whom can call to mind the fact of any such charge being made. I must therefore think Dr. Flagg is mistaken in this case.

T. L. BUCKINGHAM, D.D.S.



## CORRESPONDENCE.

## MEETING OF AMERICAN DENTISTS AT WIESBADEN, GERMANY.

WIESBADEN, GERMANY, August, 1881.

THE regular annual meeting of the American Dental Society of Europe, which was held at Wiesbaden during the second week in August, was attended by a number of visiting American dentists, who had been delegates to the International Medical Congress in London. After the close of the meeting a complimentary dinner was given the visiting brethren by American dentists resident in Europe, at the Grand Hotel Du Rhein. Dr. W. St. George Elliott, of London, presided, and all the arrangements were under the direct charge of Dr. A. A. Blount, of Geneva. In addition to these gentlemen, the hosts of the occasion were Drs. N. W. Williams, Geneva; B. Cohen, Hamburgh; A. H. Chamberlain, Rome; Willoughby Miller, Berlin; C. M. Wright, Basle; C. T. Terry, Nice; C. V. DuBouchet, Paris; and C. W. Jenkins, Dresden. The guests were Drs. J. Taft, Cincinnati; G. J. Friedrichs, New Orleans; T. T. Moore, Columbia, S. C.; J. H. McKellops, St. Louis; Geo. L. Field, Detroit; J. A. Watling, Ann Arbor; James McManus, Hartford; A. M. Dudley, Salem; L. D. Shepard, Boston; and W. C. Barrett, Buffalo.

After the *menu* had been sufficiently canvassed, and the cloth removed, toasts and sentiments were offered by both visitors and visited. Our guests, our hosts, our country, our homes and their loved ones, our profession, our schools and colleges, and our literature, were all remembered; after which

Dr. Geo. L. Field arose and said that at this happy and convivial moment, it became us well to remember those whom we loved and revered, but who, their labor o'er, had now found the rest of the grave. He desired to recall to their recollection the name of one man who had stood as prominently before the profession as any of its members; one to whom dentistry owed as much as to any other man, and though during the more conspicuous portion of his career he was not employed in the active practice of his profession, yet whose affections were closely engaged with, and whose purse-strings were open to, any enterprise which he thought might benefit dentistry. Though not in the profession, he was of it, and all his interests were connected and identical with it. A man of more generous and noble nature it is seldom the lot of any one to be connected with. He desired to propose the cherished memory of SAMUEL S. WHITE. The sentiment was drunk standing and in silence, while tears of sorrow and mourning stood in the eyes of more than one of those present.

Remarks were made by other gentlemen expressive of the grief of the profession at his loss, and of appreciation of his noble character. When men are far away from all that is nearest the heart, then it is that friends seem doubly dear, and the names of our honored dead hallowed by a thousand tender recollections, enshrined as they are in the regretful memories of a distant home and country.

Dr. J. H. McKellops proposed the health of Dr. George Watt, and called upon Prof. Taft to respond, who paid a glowing tribute to his old-time associate, and reminded those present of how much dentistry owed to the persevering labors of Dr. Watt.

Dr. W. C. Barrett proposed health and prosperity to the father of American dentistry in Europe, Dr. Abbot, of Berlin, and gave an account of a very pleasant visit which he had lately made to the genial and kindly old dentist at Schlangenbad, where Dr. Abbot had gone in the hope of building up health and strength, both sadly broken by years and long protracted labor.

After the names of a number of those present had been proposed, and their answers heard, the company separated, Dr. Taft having first been instructed to convey the greetings of the assembled dentists to Dr. Abbot, and Dr. Barrett to do the same for Dr. Watt, and to transmit to the family of the late S. S. White the condolence of those present, and to prepare for the DENTAL COSMOS and the *Ohio State Dental Journal* a report of that part of the proceedings.

W. C. B.

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## PROCEEDINGS OF DENTAL SOCIETIES.

### AMERICAN DENTAL ASSOCIATION—TWENTY-FIRST ANNUAL SESSION.

#### SECOND DAY.—*Evening Session.*

Section V., Anatomy, Physiology, Histology, Microscopy, and Etiology was resumed.

Dr. W. C. Barrett, chairman, said he had expected to read a paper giving the results of further investigations into the subject he had presented at the last meeting—the physiological action of nitrous oxide. His note-books showed a record of one hundred and forty-three vivisections and experiments, but when he had endeavored to collate the results, and get them into such order as to make them fit for presentation, he found that he was utterly unable to make any satisfactory progress. The physiological action of nitrous oxide is a subject of great importance to the dentist. It is a fact that this, the first anesthetic agent known, has been more extensively used than any other, has been in the hands of the veriest quacks, has been employed by those who have no knowledge of the

proper condition of the patient for the exhibition of an anesthetic; yet, in spite of all this, the death-rate from its exhibition has been far below that of any other agent of its class. It seems, therefore, a matter of importance to study its effects. There are a number of theories to account for the narcosis produced by it: First, that it is due to a want of oxygen. Second, that it is due to hyperoxygenation. Third, that it is caused by interference with neural nutrition. Fourth, that it is owing to some inherent quality of the agent. That the condition produced is not asphyxiation due to want of oxygen is plainly proved. Carbonic oxide, which asphyxiates, produces entirely different symptoms from nitrous oxide; we do not have the exalted nervous sensations which the latter induces. There are also many other points of difference. That the narcosis is due to hyperoxygenation seems to require little further proof than the fact that an animal lives no longer in it than in an atmosphere of pure carbonic acid. He was well aware that this statement has been questioned by high authority, and yet supported as he was by many experiments performed upon different animals, in the presence of competent dentists, physicians, and physiologists, and before college classes, he was quite prepared to substantiate it. In some of his early experiments upon dogs he had found great difficulty in anesthetizing them with nitrous oxide, and his note-books contained the statement that they seemed to breath it with comparatively little effect. Yet further experimentation had shown him the error, which was subsequently eliminated, and he found that dogs lived no longer when breathing it exclusively than other animals. Post-mortem appearances of animals killed with nitrous oxide gave no indication of hyperoxygenation beyond the fact of the light color of the blood, and he was prepared to show that this was produced not by oxygenation but by the direct action of the gas itself. That it is due to interference with neural nutrition would presuppose a change in the blood-corpuscle, which is not observed. There still remains the fourth explanation. The speaker fully believes that nitrous oxide is a true anesthetic. The difference between its observed effects and those produced by either chloroform or ether is not greater than the difference between the effects of those agents. Its occasional innocuousness is due to its lack of toxic power. It is not in solution in the blood in sufficient quantities. In order to produce complete anesthesia air must be excluded and the system must be overwhelmed with the agent, and even then its effect is evanescent. It has been urged that nitrous oxide is a supporter of respiration. Experiments in vivisection, which he would be glad to perform before the association anywhere but in New York City (where, when it was necessary to choose as to whether man or some of the



lower animals should suffer, Mr. Bergh was always upon the alert to exhibit his fellow feeling for the latter), prove that this is not the case. It is utterly impossible to establish physiological facts unless they are first demonstrated on inferior animals, though they need not necessarily be made to undergo suffering. In every experiment, and he had repeated the tests over and over again, the animal lives as long in the carbonic acid gas as in nitrous oxide. In one the narcosis ensues in two minutes, and death in from ten to fifteen; in the other a convulsive death in about the same time without any anesthesia whatever. The post-mortem appearances are different. In the case of an animal killed with carbonic acid the brain is usually anæmic, and the tissues bluish in color; after death from nitrous oxide the brain is hyperæmic, and the tissues light-colored. That the nitrous oxide gas unites with the blood is true. Nitrogen dioxide unites with it more surely, and produces a more marked change. As a matter of course when the gas is united with the blood, it is held in solution, but he (Dr. Barrett) has seen no proof of oxygenation. Before this can be accomplished the decomposition of the gas is required. A lighted match placed in a jar of nitrous oxide burns nearly as brightly as in oxygen, because the heat is sufficient to decompose the gas, freeing the oxygen, which supports the combustion. But it cannot be decomposed and oxygenate the blood at the temperature of the body, 98° or 99°. Different animals live for different periods in nitrous oxide. In one experiment a pigeon placed in carbonic acid breathed about sixteen minutes; another, in nitrous oxide, lived only about three minutes. A medical professor who witnessed the experiments was surprised at the results, and declared he would have to go over his physiology and chemistry again, as all his previously conceived theories were completely disproved. It was found that the duration of life of the pigeon exposed to the carbonic acid was due to the fact that birds are supplied with abdominal reservoirs which contained sufficient air to keep them alive for a time. To prove this a number of pigeons were anesthetized, and the point of the sternum raised sufficiently to allow him to introduce a bistoury and rupture the membranous sac. The trachea was ligated and the birds breathed through the abdomen. After their recovery some were placed in jars of carbonic acid, and others in nitrous oxide, when it was found that they lived no longer than other animals.

In these experiments he did not set out to bolster up any preconceived theory with regard to the effects of nitrous oxide. Had he done so his studies would have been unworthy the name of investigation. His object was simply to observe and record fact as they appeared to him to the end that truth might be served.

Dr. Buckingham. Has the nitrous oxide any specific effect on special organs, or is the condition which it produces a general anesthesia.

Dr. Barrett thinks he can ascribe the immunity from fatal effects to its lack of power. He could not see that any special organs were specifically affected, unless possibly the brain was. He thinks when danger arises it comes from blood-pressure on the brain; that in those who die from its effects the symptoms are very similar to those of apoplexy. When animals have been killed with nitrous oxide, he has found the ventricles engorged.

Dr. Meigs. How long can the anesthesia of nitrous oxide be prolonged?

Dr. Barrett. I have kept a patient under the influence for thirty-odd minutes. This was accomplished by allowing the patient to inhale sufficient air to prevent asphyxiation, but not enough to destroy narcosis. I think fifteen or sixteen minutes as long as animals will live if kept continuously in an atmosphere of pure nitrous oxide; human beings will not live so long. It is very difficult to anesthetize dogs, because they will twist the mouth around slightly and get a small opening sufficient to admit oxygen, which will defeat the object in view; to produce the narcosis you must overwhelm the system quickly.

Dr. Meigs asked if there were not great variations in the capacity of different individuals. He had seen patients who required thirty or forty gallons to cause anesthesia.

Dr. Barrett. Some persons have almost immunity from the effects of certain drugs. This is due to some anatomical or physiological peculiarity of the individual, and not to any inherent quality of the drug.

Dr. Bödecker. Dr. Niles is not quite well-informed as to the nervous supply. The gray matter, or axis cylinder, is continuous from the nerve center to its termination, and is enveloped in the white substance of Schwann. Dr. Niles stated also that the nerves are intimately connected with the ultimate muscular fibers. The speaker had never seen it. The nerve enters the myolemma and there is lost to sight.

Dr. Atkinson would ask of those who use the term freely, what is meant by "reflex action?" I have never seen a satisfactory definition of it. There is a wide field here nearly unexplored, which will have to be wrought out before we shall understand it. We say we understand the nervous system, but we find different views about it among the physiologists, and different accounts of what has been seen under the microscope. Dr. Bödecker has stated what I have seen. After losing the white envelope the nerve enters a

mass which has not been determined, but which I have called the "neural mass." It is common to call every obscure irritation "reflex action," without knowing what it is. I take it that reflex action is a disturbance of the continuity of the nutrient nerve current in transmitting pathological impact. I have never heard reflex action satisfactorily accounted for. Hearing, seeing, tasting, smelling, are all instances of reflex action, if not also, all the secretory functions.

Dr. Barrett. In the discussion of reflex action, or nervous action or impulse, we need a point of departure. First, we must know what is nervous force, and then follow on with the facts and the laws. The later theory of the physicists is that light, heat, and electricity are but modes of motion, and that they are mutually convertible. The electric light is an illustration of the conversion of electricity into light; it may also be converted into heat, as in the actual cautery. Wherein does nervous force differ from other modes of motion except in its manifestation? Sight, hearing, taste, are all the results of molecular changes. While we admit that all other forces are one, why should we exclude this. Every one who has conducted physiological investigations has seen light and heat converted into nervous force. A dog may be anesthetized to the entire obtunding of sensibility, and paralyzation of the sensory and motor nerves. If you then dissect out the pneumogastries and open the thorax and apply the battery you can see all the phenomena of actual life. The result is not because of something inherent in the electric current; it is not that it follows the course of the nerve and its distributions, for it is no insulated conductor, and the current takes the shortest course through the tissues; but it is an impulse, a wave, which once induced, is transmitted independently of the exciting cause, and it produces phenomena, analagous to or identical with those nervous impulses active in life. It is only when vitality is gone, and a sufficient time has elapsed for the nerve-tissue to lose its power to take on physiological molecular movements that these induced changes are no longer possible. In the living body we find that the molecular changes of nutrition are developed as nervous force, precisely as the chemical changes are developed into electrical phenomena. To his mind it is incontrovertible, and there is a preponderance of testimony to sustain the view, that nervous force is but another mode of universal motion.

Dr. T. L. Buckingham, Philadelphia. The theory is that nervous force is but a mode of motion, but we cannot conceive of motion originating itself. To suppose that light is a mode of motion they had to conceive of an ether pervading all space, without being able to demonstrate it. We must either suppose that there is some such medium, or that light is an entity projected through this space. If



force can be changed we must allow that it can be lost, and this is contrary to our theory. I have undertaken to illustrate my idea of force by analogy: We have laws passed by the proper authority and thus becoming the will of the people. But we cannot convert one law into another. So we cannot convert one force into another force. When matter was created some power said it should do certain things under certain conditions. We can trace nerve-force through its effects on the nerves, but we cannot tell how the sensation it causes is produced. Sound waves strike the tympanum and are conveyed to the brain by the nerves, but we do not know how they are converted into sound. It has been said that if you can give gold another property it will be a different substance. Now, the theory is that all recognized materials are merely differing manifestations of one—the old theory of the alchemists.

The papers of Drs. Niles and Bödecker were passed.

Dr. Buckingham desired to call attention to the lack of a proper dental nomenclature. At a late meeting of the New York Odontological Society, one speaker described secondary dentine as one thing, and another described another condition which he called secondary dentine; another had still a third explanation. Dr. Buckingham thought the section on nomenclature, by giving an authoritative definition of such matters, would be doing the profession a greater service than their present line of investigation seemed likely to accomplish. As another instance of what the speaker meant, Dr. Abbott, at a previous session of the present meeting of the association, had used the term inflammation as applied to the decay of the dentine. Now, what is inflammation? In the books the phenomena given as characteristic of inflammation are four—heat, swelling, color, pain. But do these in themselves constitute inflammation? We may have each one separately without any symptom of inflammation; we may have several, perhaps all of them, and yet they may not constitute an inflammation. The most probable theory is that inflammation commences with an irritation in the tissue, and is then but an excited state of normal conditions. When this excitement extends to a certain stage, stasis of the circulation takes place, and we have swelling by congestion of the tissues, and heat and color follow as a consequence. Can these changes take place in the dentine? or should we call the excitement which we have in the dentine when it is diseased, inflammation, without its showing the phenomena of inflammation? As it is a living body it certainly can be deprived of its vitality, and may then run through the process of putrefaction or decomposition. Decay may commence on the outside of the tooth and extend through the dentine, or the dentine may break down. You do not have decay until there is some-

thing to dissolve out the lime-salts. Sometimes we have chalky dentine, which is dead dentine, with the animal matters removed, and in other cases the earthy may be dissolved out, leaving the animal, which may be recalcified. We may represent the organic matter in a tooth by glue, in which the earthy matter is deposited, the glue surrounding every particle of earthy matter. In the embryonic condition the spaces in this gluey matter are filled with water, which constitutes sixty per cent. of it; the tooth contains only ten per cent. of water, the difference representing the quantity of water displaced by the lime-salts. The speaker takes exception to the term inflammation as applied to decay of dentine, unless some such explanation as this is adopted.

Adjourned.

(To be continued.)

## INTERNATIONAL MEDICAL CONGRESS, 1881—SECTION ON DISEASES OF THE TEETH.

### THIRD DAY.

DR. W. H. ATKINSON, New York, read a paper "On the Reproduction of Bone, with Especial Reference to the Variable Portions of the Maxillary Bones," which contained the following statements:

Necrosis has been hitherto considered as sudden, but it is not so. Solution of the lime-salts constitutes either caries or necrosis. The modern injunction is to remove all dead bone at once; do not, as the text books say, wait until the necrosed portion is separated. The removal of the dead bone leaves a pocket which forms a receptacle for pabulum, and this is a *sine qua non* to bone-repair. All tissue is produced from protoplasm. Disease is one in origin and in mode, and has its production in debility.

Dr. Walker, London, opened the discussion on "The Premature Wasting of the Alveoli, ('Riggs's disease'), and its Amenability to Treatment." He directed his observations to the normal production of bone after the extraction of teeth; the normal absorption of the socket; and the normal absorption of the root of a temporary tooth. Normal absorption differed essentially from the abnormal. Dr. Walker stated that the hypertrophied condition of gum which exists in these cases consists of an increased amount of fibrous tissue, while the vascularity is decreased. The starting-point of the disease was shown to be a subacute inflammation in the pericementum, whence it passed to the bone; and the point of interest was to account for the great activity of this subacute process. He exhibited some microscopic preparations, and two diagrams, illustrating on the one hand the normal processes of bone-formation and bone-absorption.

and on the other the abnormal processes of inflammation and recedence of the gum. One diagram represented effusion into the socket from which a tooth had been extracted, and the after bone-formation, with absorption-crypts on the outer and inner surfaces of the alveolar margins. The other showed a section of a tooth and jaw with the hypertrophied gum upon the bone.

Dr. Arkövy, Budapest, referred to the pathology and etiölogy of the disease known as pyorrhœa alveolaris. He considered that from four to six times as many teeth were lost from that cause as from caries; and also that the term pyorrhœa, as indicating a flow of pus, was neither a sufficient nor an explicit expression of the conditions which existed. He had directed special attention to the microscopical examination of the pus from such cases, and this he found to consist of pus-cells, leptothrix, and other fungi. In all cases these fungi were to be found, many of which had fine processes extending from them. For this latter fungus he had not been able to find either a name or a classification. Other masses were present in the pus, and these contained great numbers of bacteria. In a solution of sugar and water containing a piece of meat, he found, after forty-eight hours, sphero-bacteria, with the same thread-like processes, and these he considered to be leptothrix. After three days, small sacs or cell-like bodies appeared; and, after seven days he found micrococci. Finally, he considered that the disease takes its origin from fungi.

Dr. Iszlai József, Budapest, had followed in the same line of research as Dr. Arkövy, and found not only leptothrix, but also mycelium.

Dr. Riggs, Hartford, Conn., disclaimed personal origin of the name frequently given to this disease—the term “Riggs’s disease” having been bestowed because of his mode of treatment. He had been engaged for forty years in investigating the disease, and he found it to be at first only an inflamed condition of the margin of the gum, progressing to the bone, and leading to necrosis. The treatment was surgical, not by acids and medicines. In his experience, ninety per cent. of cases can be cured.

Mr. Walter Coffin, London, explained that his father’s successful treatment of this disease was, in his opinion, the supplementing of a removal of mechanical irritation and conditions keeping up disease, by a very thorough antiseptic treatment with the strongest liquid carbolic acid, applied locally only, and very exactly to the positions of purulent discharge between the tooth and its socket and the gum. He believed that Riggs’s treatment bore to this about the relation that the *cleanly* treatment of wounds bore to real antiseptic surgery. The peculiar chemical reaction of phenylic



alcohol with the tissues saturated by the particular discharge of this disease, fully confirms, in his opinion, the septic theory of its origin, whether associated or not with the predisposing or aggravating influences of necrosis, calculus, or other causes.

Mr. Oakley Coles considered the disease an expression of some general condition, and warned practitioners against a too localized treatment. He believed fungi to be secondary to, and dependent upon, the disease. The nodular condition of the tartar which was found upon the roots of the teeth so affected, arose from the deposit taking the shape of the cancellated bony socket.

Dr. Atkinson, New York, held as sound the opinion that the disease arose from constitutional debility. He deprecated the use of stiff brushes, and advised the application of chloride of zinc—twenty grains to the ounce of water—and good living.

Prof. Shepard, Boston, spoke strongly in favor of the treatment advocated by Dr. Riggs.

Mr. C. S. Tomes cited a case of well-marked disease affecting many teeth in one mouth. All the teeth were, from the circumstances of the case, extracted, and on many not a scrap of tartar was to be found.

Mr. John Tomes, F. R. S., read a paper on "Dental Education." This paper was a long and exhaustive exposition of the entire scheme of dental education, in which the history of dentistry in England, and the passing of the Dentists' Act were briefly sketched.

After some remarks from Dr. Butler, Dr. Atkinson and Dr. Shepard, Dr. Hollaender said that in Germany they had no Hunter, Bell, Tomes, Cartwright, or Coleman, dentistry being yet in its infancy. Up to ten years ago the profession had no status, but now those who begin the study of dentistry must have a good general education. Yet "dentist" was still a term of opprobrium. In Germany they try to make their pupils dentists first and medical men afterwards.

Dr. Taft, Cincinnati, alluded to the schemes and efforts of Dr. Hayden, Dr. Harris, and others, for advancing the study and status of dentistry in the United States. The establishment of special dental institutions was the best thing that could be done, and the best thing under the circumstances had been done. Now the doors of the medical colleges, which were at first closed, are open for the study of dentistry, and the medical profession recognizes the dental profession as one wing of the great healing army.

Dr. Marshall H. Webb, Lancaster, Pa., read a paper on the "Restoration of Contour, and Prevention of Extension of Decay."

To prevent extension of decay, operations must be performed in such a manner as to have the margins of enamel free from contact

with the tooth adjoining. The enamel remaining around a cavity in the approximal wall of a bicuspid or molar tooth should be cut away towards the buccal and palatal or lingual walls sufficiently to insure the freedom of the margins when the operation is completed.

That operations may be successful, every cavity must be so prepared that no disintegrated tissue remains, except there be a little discolored dentine near the pulp, and that should be left for its protection. The margins of enamel should be slightly beveled where gold is to be placed over them, and they ought always to be made smooth and even with fine, sharp burs, files and emery cloth. A groove, about the sixty-fourth of an inch deep, should be cut along each wall of the cavity, and must be made in the dentine within and near the line of both the buccal and palatal or lingual portions of enamel. It ought to extend from the masticating surface to, but not along, the cervical wall, and a starting-point should be made in that part of the dentine between it and the enamel or cementum which shall be the safest. This point must be just deep enough to retain the narrow pieces of cohesive foil first inserted, while other pieces are being built upon them and the filling-carried along to the groove in each wall of the cavity. The gold ought then to be placed against every portion of the dentine, packed as perfectly as possible along the enamel, and a little beyond the margins, and carried fully to the line that originally defined the contour of the part.

The rubber-dam ought always to be applied, and the teeth be wedged apart at, or previous to, the commencement of an operation, and, after the contour of the missing tissue has been completely restored, a fine saw or file, and then fine emery paper should be used to trim the filling to the prepared edges of enamel, and form and finish the gold like the original outline of the part. Fine burs should be used for trimming or shaping the gold on the masticating surfaces of teeth. The final finishing should be done with fine pumice and silex on linen tape and cones of wood, after the rubber-dam has been removed.

In every case the contour ought to be completely restored, particularly the approximal surfaces of the bicuspids and molars, and the gold should be carefully trimmed down to, and finely finished with the margins of enamel, which margins, in such cases more especially than in others, must be free from the adjoining teeth to prevent extension of decay.

Restoration of contour prevents contact of the margins of enamel, and this prevention is necessary for the preservation of the remaining tissue, especially when the tissues of the organ operated upon are not fully calcified. The contour of missing tissue ought always to

be so restored with gold that the enamel of one organ may not be in contact with that of the next in the arch, and also, that a part of the gold in one may be against, or tightly knuckled-up to, the normal tissue of the tooth adjoining, or to a filling (if one has been inserted) in it; then disintegration is not likely to take place, because of the freedom from proximity, and the cleansing (by the saliva or fluids taken into the mouth, if by nothing else) of the margins of enamel against which the gold has been placed.

Separations ought not to be made between the teeth, for the reasons that they interfere with mastication, annoy the patient, and, with few exceptions, do not prevent disintegration upon or about the surfaces that have been cut. The teeth separated again come in contact almost invariably, excepting where antagonists prevent them; food wedging between them undergoes fermentation and disintegration takes place, and that, too, in a part of the tooth where it is difficult to perform a first-class operation. This may not occur, however, till long-continued pressure of food paralyzes the nerves in the papillæ throughout the gum-tissue pressed upon, and breaks the circuit or obstructs the movement of the molecules of living matter through that fine reticulated line between the gum and the brain, and the patient is no longer notified of the presence of such obstruction to the neural and vascular circulation. This condition of the gum-tissue as inevitably leads to the return of its elements to the embryonal state, as does interference with the nutrition of any other part of the system. When the gum is in normal condition, it is so close to the necks of the teeth as to prevent the lodgment of foreign matter beneath its margins. The gum fills the space between the teeth almost entirely, and protects all the parts it covers, and this myxomatous tissue should always be protected by full restoration of the contour of the enamel that is missing. The gold ought to be finely finished at all points, that there may be no obstruction to the tissue again closing around the neck of the tooth operated upon. In this manner the margin of enamel at or near the neck of the tooth, against which the gold is placed and smoothly finished, is protected by the gum, and, if the whole operation has been properly performed, extension of decay at that part is prevented. If disintegration does not extend to or beneath the margin of the gum (and especially if calcification is imperfect), both the enamel and dentine of the approximal, as well as of the buccal surface of the tooth being operated upon, ought to be cut away with fine burs to fully the thirty-second of an inch above the part where the gum closes around the tooth, so that when the operation is completed this part may be protected from particles of food. When the necks of the teeth are kept separate as in nature, and the



gum is in normal condition, it protects the portion of enamel and the well-inserted and finely-finished gold beneath its margins so perfectly that disintegration, and even discoloration is prevented. This protection of the parts continues, unless, in after years, there be diminished circulation in the capillaries and lack of nutrition to the gum, and it commences to return to embryonal corpuscles. Decay may then take place at the necks of the teeth, though at the age when there is usually loss of molecular tone and recession and loosening of the gum-tissue, there follows deposition of lime-salts under or about the margins of the gums. This deposit may incite pericementitis, and the result may be the breaking of the fine line of living matter in the net-like arrangement between the epithelial and other bodies of the part, and the prevention of the rebuilding of the tissue.

When the operations referred to have been properly performed, and the gold is finely finished, they are the best for the protection of enamel, against or over which the gold is placed, and for the prevention of the wedging of food upon, and the consequent recession of the gums; they subserve well the purpose of mastication, and present a beautiful appearance, and the only way to keep the margins of enamel of the approximal surfaces of the teeth permanently separated, and prevent extension of decay, is to fully restore the contour of the tissue that is lost.

#### FOURTH DAY.

A paper entitled "An Investigation into the Effects of Organisms upon the Teeth and Alveolar Portion of the Jaw," by Arthur Underwood, M.R.C.S., L.D.S.Eng., and W. J. Mills, was read, detailing the varieties of organisms most frequent in the mouth; the conditions favorable to their existence and proliferation; their chemical products, and the conditions which render their life impossible. It then went on to describe the effects of organisms upon enamel and upon dentine. Their presence was demonstrated by microscopical sections, in which the germs were stained with methyl violet. Their effects on the dentine were demonstrated by contrasting the destruction of tissue: (*a*) in teeth subjected to the action of acids under aseptic conditions; (*b*) in teeth subjected to the action of germs under excessively septic conditions. Previous experiments upon the causation of caries were investigated with the object of showing that wherever experimenters have succeeded in producing caries artificially, they have subjected the teeth to septic conditions, or where they have employed antiseptic agents (carbolic acid and creasote) they have not succeeded in producing caries. The paper concluded with an account of the effects of organisms upon the surround-

ing tissues, alveolar abscess, the difficulty of maintaining a septic condition in the mouth, and with a brief *resume* of the author's experience with eucalyptus oil and iodoform, and results of their use: (a) in alveolar abscess; (b) in dead roots; (c) in roots partially dead.

Observations were made by Dr. Taft, who considered the influence of germs of fungi in the causation of caries. The experiments were interesting, but they looked in one direction only. It was, indeed, impossible to simulate, out of the mouth, and on dead tissues, the changes which took place in the mouth during life.

Mr. John Tomes thought that until we had some better explanation of dental caries, we might provisionally accept the conclusions which this paper set forth.

Mr. C. S. Tomes pointed out that these researches into the production of caries were the first experiments on the production of caries by septic organisms made since the results of Pasteur, Tyndall, and others were published. He drew especial attention to the statement in the paper, that when the germs were excluded from the solutions and teeth, the experimenters failed to produce the results illustrated, or to find bacteria; but if the germs were admitted, they were found in the caries. The experiments, he thought, had a practical bearing on the whole of the dentist's work.

Dr. M. S. Dean, Chicago, read a paper on "Alveolar Abscess," in which he stated that death of the pulp was a remote cause of alveolar abscess, while the immediate causes were various agents which find their way through the apical foramen. Abscess, with sinus, was most easy to treat, and was readily brought to a successful termination. He insures creasote reaching the abscess by first making patent the apical foramen, then placing a little cotton with creasote in the pulp-canal, and a bolus of soft rubber in the orifice of the cavity. Then, by pressing upon this elastic ball, the creasote is forced into the sac and through the sinus. Blind abscess he found more difficult of treatment, and preferred eucalyptus and phénol sodique. In stubborn cases aromatic sulphuric acid, though painful, is very effectual. If the abscess does not yield to this treatment, an artificial fistula should be established.

Dr. Walter Coffin made some observations on the application of hydrogen dioxide to alveolar abscess. There was a sudden decomposition of the unstable compound, with the evolution of nascent oxygen, which, by the pressure caused, was forced into the sac. There could be no more effectual application of an antiseptic than this, and he had had good results in the few cases in which he had used it.

Dr. Norman W. Kingsley, New York, read a paper on "Civilization in its Relation to the Increasing Degeneracy of Human Teeth,"

which stated that the most important problem now confronting the dental profession is embodied in the daily parental inquiry: "Why are my teeth decaying more than did my father's or my mother's? and why are my children's teeth decaying at an earlier age than mine?" This inquiry does not come to any extent from the lower classes of society, or from those who are habitually neglectful of their persons, but from that class who are the most refined, intelligent, and cultured in the community.

The anxiety expressed is not groundless, but has sufficient cause to justify alarm. A prevalent idea among unprofessional people is that candy-eating is the cause of decay in children's teeth, but the idea, in its broad application, is fallacious. Various theories have been advanced by professional observers from time to time, such as "living upon soft food," "living upon bread from bolted flour," or the "bran-bread theory;" the theory that "contact always produces decay," "hot and cold drinks," "the ice-water of the Americans," "climatic influences," "want of cleanliness," "inter-marriage and the mixing of types," etc., etc. The fallacy of regarding any of these as a sufficient answer to the inquiry was shown, and they were considered as of secondary importance, and not as primary causes. Neither, individually or all together, gives the cause.

The relation of civilization was discussed,—a term which, in the minds of most of those who use it, has a very vague and incomprehensible connection with the subject. "What is civilization?" and what has civilization to do with decaying teeth? Civilization is the benefactor of mankind; the chiefest blessings of the human race are the result of its civilization. Civilization is not responsible for the physical or other evils which follow in her path—not responsible for the decay of teeth. The evils come from the neglect of, or the abuse of, the agencies, the resources, or the products of civilization. The most alarming evil of civilization at the present time, from a hygienic view, is the increase of nervous diseases; and coincident with this, and co-related to it—each influencing, and, in a measure, causing the other—is the increasing deterioration of the teeth. Every excessive nerve-strain impairs nutrition, and with lack of nutrition the teeth become degenerate.

In the discussion which followed, Dr. Kirby Beard gave a cordial support to the theory advanced by Dr. Kingsley.

M. Magitot could not accept the theory in the absence of statistics to support the views of the author.

Mr. Mummery, L.D.S.Eng., read a paper on "Caries," in which he showed that the infrequency of dental caries, or of contracted jaws, was related to the use of metals. In the stone age caries and irregularities of teeth were unknown, but as iron and other metal in-



struments, indicative of increase of knowledge and art, came more and more into use, so did those diseases become apparent and increase in frequency. He also compared the teeth of those who lived in mountainous and in marshy districts, and found the diseases more prevalent in the latter. He also alluded to the effects of water with carbonic acid and other gases in solution upon the teeth, and to the teeth of sailors and agricultural laborers.

#### FIFTH DAY.

Mr. W. H. Coffin, F.C.S., read a paper on "A Generalized Treatment of Irregularities." This paper was accompanied by models, selected from several thousand, recording for twenty-five years the treatment of, perhaps, an unusual number of the irregularities met with in an average practice, and by photographs and apparatus illustrating the evolution of an almost generalized method. Classified by their mechanical circumstances rather than pathology, a number of cases admit of immediate correction directly by a variety of means; but the majority were shown to present conditions, involving, in any rectification, a certain expansive change common to them all. The accidental splitting of a plate, while in use, by a wooden wedge, with surprisingly satisfactory results, suggested to the author's father, about twenty years ago, his well-known expansion-plate. Its function is the mechanical anticipation of favorable conditions, by permitting a relative motion, or maintaining a controllable reaction between its independent symmetrical halves. Details of construction were fully described and illustrated by examples shown. Its application is either permissive, auxiliary, or direct. In the former, it may embody any ordinary regulating expedient or device, while making room for—instead of impeding by rigidity—the adjustment of teeth misplaced, turned, overlapping, or retarded in eruption. Direct spreading of incisors, when in contact, for operation on caries, almost painlessly replaces wedging, maintaining, moreover, space without irritation during any treatment. Differential and unilateral expansion were described in unsymmetrical contraction, and as replacing the local use of screws, inclined planes, levers, and ligatures. The employment of steel piano-forte wire, and its chemical behavior, were mentioned. The special treatment of narrow jaws, with high, contracted roofs, was considered, and as to apparent alteration in the shape of the palate vault in such cases, conjectured inter-osseous changes were discussed. Limitations of age are not exactly known, most cases being eight to sixteen, many older; reference was made to models of considerable expansion at forty-five, for overlapping incisors, and of quite extensive regulation at thirty. Attention to the general health of the

mouth, and simple self-adjustability of plates for the co-operation of patients in cleanliness was insisted upon.

Dr. Thomas Brian Gunning, New York, read a paper on the "Causes of Irregularities of Position of the Teeth." of which the following is an abstract:

1. The size and the shape of the jaws may cause irregularities of position of the teeth; disease sometimes, when, except for it, all would be normal.
2. Premature loss of temporary teeth, more than undue retention of them, causes irregularity of position of the permanent teeth.
3. Disease of one or more temporary or permanent teeth, or the loss of either, may deform the lower jaw and also displace it, and thus cause irregularities of position in the adult set of teeth.
4. Mistaken views in respect to the treatment of teeth frequently lead to irregularities of their position, sometimes to their loss or injury, and even to serious deformity.

Brief remarks were submitted in support of these propositions, and the means used, and those best adapted to counteract and to remedy irregularities of position of the teeth were pointed out.

Mr. Oakley Coles, L.D.S. Eng., read a paper on the "Origin and Treatment of Certain Irregularities of the Teeth." The author referred to his classification of deformities of the upper jaw, to be found in the recently published third edition of his work on that subject, and then stated that at birth all upper jaws, in which there were no lesions, were normal in form, and presented no evidence of what the ultimate outline of the dental arch would be. He then entered upon a consideration of the influence of the antrum in regard to certain irregularities of the teeth, and was of opinion that an irregular growth of the external wall of the antrum was a cause of hypognathism, and associated with struma. Allusion was made to the relationship between the sphenoid, the premaxillary bones and the antrum, in reference to dental and maxillary irregularity of form and arrangement. He then considered certain points in the mode of treatment, and recommended the expansion of the whole maxillary arch, and not of the teeth only.

Dr. Iszlai József, Budapest, read a paper "Illustrating Sketches to Carabelli's 'Mordex Prorsus,' and its relation to 'Prognathia Ethnologica,' and Meyer's 'Crania Progenæa' (?)"

1. Exact determination of objects and their nomenclature is important in every profession which claims to be regarded as scientific. Dentistry has—principally in the last three or four decades—in most respects pursued and attained this. Yet, relative to the different kinds of closure of front teeth, such exactness seems to fail. It was attempted to prove this by a critical survey of Carabelli's statements on this subject, as well as of the relative

opinions of other authors. The writer gave his own views on the subject, illustrated with a few anatomical specimens.

Alfred Coleman, F.R.C.S., etc., read a paper on "Erosion, or Decay by Denudation." Mr. Coleman had seen more of this disease in the female than in the male, but perhaps that was due to more female patients having been seen. All the teeth so affected, which he had examined, were of a more or less horny-like nature, and he considered the cause as mechanical. The paper was illustrated by microscopic preparations, diagrams, and casts from several animals.

Mr. C. S. Tomes said that the opinion largely entertained on the continent was that the disease was due to caries; but, the softened tissue being worn away, the appearance was different from caries. He thought that friction was the chief factor in its production, and was of opinion that it was more marked on that side of the mouth which was subjected to the greatest amount of brushing.

Mr. Gaddes related the circumstances of a case recently under his treatment in which the grooves were most marked in the teeth of the upper and lower jaws on the right side. The patient was right-handed, but on the left side, where friction from the tooth-brush would be supposed to be greatest, there was little or no manifestation of erosion. The patient, a surgeon, also thought he applied less friction to the right side. The cavities in this case were very sensitive.

Dr. Taft, Cincinnati, said there were several phases and varieties of this disease. In deep cavities in certain situations friction of the tongue or the brush could not cause the condition, because they could not reach the places. He had seen cases in which the grooves were deep, and had sharp edges as though cut out with a cutting instrument. They were not rounded borders as a brush would form them. He suggested treating the margin of the gum.

#### SIXTH DAY.

Dr. J. Taft, Cincinnati, O., read a paper on "Antral Abscess," in which having given a description of the anatomy of the antrum, he said the disease to which it was most frequently liable was engorgement, as by serous or mucous fluids. This condition is indicated by a sense of increased weight; then, as the cavity becomes filled, there is a sense of fullness and pressure, with distention of the walls. When the affection is dependent upon local causes the treatment is likewise local. If the natural opening into the nose is closed, and the trouble does not yield to applications to the nasal mucous membrane, an instrument should be passed along the middle meatus, and the opening into the antrum dilated. An opening may, on the other hand, be made through the canine fossa, or through the socket of the root of a molar tooth. Mild stimulating and antiseptic lotions can



be injected through the opening; but over-treatment must be avoided. He then considered suppuration of the antrum, and the effects of disease upon contiguous parts; and, in conclusion, referred to the liability to treat those secondary affections for primary causes.

Mr. C. S. Tomes said it was almost unnecessary to use a syringe in cases where there was an opening into the antrum. The patient can, with a small amount of education, fill the mouth with fluid and force it into the antrum.

Dr. Deutz, Utrecht, read a short paper suggesting that the term "caries" be abandoned as inappropriate, on the ground that caries of bone was in every respect different from dental caries. The use of the same term for different diseases caused great perplexity not only to students, but also to surgeons and practitioners who do not make a special study of dentistry.

Dr. W. H. Atkinson combated the views of Dr. Deutz, contending that there was only a difference of degree between caries of the teeth and caries of bone.

Mr. Hunt, Yeovil, showed the results of some of his recent experiments with the electrotype process in obtaining models and reverses for working celluloid, etc.

A communication was read on "Contour Restoration of the Superior Incisors," by Dr. E. Parmly Brown, of Flushing, N. Y., who illustrated, by means of diagrams, his treatment of caries in its several stages.

The president brought the business of the section to a close, with an appropriate address.

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### OHIO STATE DENTAL SOCIETY.

THE sixteenth annual meeting will be held at Columbus, Wednesday, Thursday, and Friday, December 7, 8, and 9, 1881.

Members of the profession from other states are cordially invited to attend. The State Board of Dental Examiners will meet at the same time and place to examine applicants for license.

W. H. SILLITO, *Recording Secretary*.

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## EDITORIAL.

### DENTAL SCHOOL IN RUSSIA.

A correspondent at St. Petersburg (Dr. A. D. Murphy) writes us that the first dental school in Russia was opened in that city on September 19, 1881, and that "there is every reason to believe that it will be a success, as all the Russian gentlemen who founded and are connected with it are most competent and energetic men. There are already about thirty matriculates, including several female students."

## BIBLIOGRAPHICAL.

**THE PHYSICIAN'S VISITING LIST FOR 1882.** Philadelphia: Lindsay & Blakiston.

This is the thirty-first year of the publication of this excellent little visiting list. In size it is compact and convenient. It contains a new table of poisons and their antidotes, the metric or decimal system of weights and measures, posological tables, with other information in compact form which it is useful for the physician to have ready at hand. The usual blanks are given for visiting list, memoranda for each month in the year, address of patient and others, accounts, memoranda of wants, obstetric engagements, vaccination engagements, record of births and deaths, general memoranda, etc.

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## OBITUARY.

**JAMES TAYLOR, M.D., D.D.S.**

By the sudden death of Dr. Taylor, which occurred June 12, 1881, a long and useful career was brought to an end. He was one of the foremost workers in the foundation of the Ohio College of Dental Surgery, and from its establishment to his death was continuously, we believe, a member of its working faculty. Although in the seventy-second year of his age, and pressed with the demands of a large private practice, his lectures during the last winter course were marked with his usual vigor.

**BYRON F. COY, D.D.S.**

DIED, in Baltimore, July 20, 1881, Dr. Byron F. Coy, in the fifty-fifth year of his age.

Dr. Coy was a native of Maine, but had resided many years in Baltimore, where his practice was large and lucrative. In recognition of his skill as an operator, the Baltimore College of Dental Surgery conferred upon him the honorary degree. He was one of the founders of the Maryland Dental College, and a member of its faculty. He had been president of the American Dental Convention and of the Maryland and District of Columbia Dental Society.

**Dr. C. F. MARTIN.**

DIED, at his residence, Norfolk, Va., on August 21, 1881, Dr. C. F. Martin, in the seventy-second year of his age.

Dr. Martin was one of the oldest dentists in the South. He was a native of North Carolina, but had resided for nearly half a century in Norfolk, where he was widely known, and respected among all classes.

### DR. WILLIAM FISHBOUGH.

At a meeting of the Brooklyn Dental Society, held July 11, 1881, a committee (consisting of Drs. G. A. Mills, W. H. Atkinson, and O. E. Hill), which had been appointed to take action with reference to the death of Dr. William Fishbough, reported resolutions of respect to the memory of the deceased, expressing appreciation of his broad intelligence and genial character, and condolence for his loss. The resolutions were adopted, and a copy of them was ordered to be sent to his family.

### HENRY COY.

DIED, at Palmyra, N. J., September 2, 1881, of malarial fever, Henry Coy, in the fifty-seventh year of his age.

Mr. Coy was for several years in charge of the instrument department of the manufactory of the late Dr. Samuel S. White, and it was during this period that notable advances were made in the quality of dental instruments over any previously produced.

### PERISCOPE.

**ANTRAL DISEASE—INSTRUMENTS FOR ITS TREATMENT.**—Between the floor of the orbit of the eye and the apices of the roots of the molar teeth there is a natural cavity, about the size of an ordinary hickory-nut, termed the Antrum of Highmore, or the superior maxillary sinus. The dome of this chamber is very thin, as is also the posterior wall which constitutes the tuberosity of the superior maxillary bone. The outer wall of the sinus, however, which constitutes the basis for the cheek, is about twice or three times as thick, but at most only about equal to that of a strong egg-shell, while the floor of the chamber, owing to its unevenness, varies from a mere film over the apices of the second molar roots to perhaps one-fourth or one-half of an inch over those of the first molar tooth, while the apices of the roots of the third molar may nearly perforate the ossific portion of the floor. When the dental pulps die and decompose, the gas generated therefrom frequently poisons the socket about the apices of the roots, sometimes causing alveolar abscess, the contents of which occasionally find exit into this cavity, causing the walls to become more or less diseased. After the pain subsides by the escape of pent-up gas, the subsequent discharge may naturally enough pass as catarrh, and sometimes be allowed to continue for months or years before its true nature is discovered, in which case the lining membranes and surrounding bony walls may have become diseased by the presence of the obnoxious discharge.

In the past eighteen years, while examining to ascertain the condition of the walls in alveolar abscesses, through natural as well as artificial fistulæ, by means of a delicate flexible probe, I have found the floor of several antral chambers perforated by the burrowing of the pus, which revealed, to the surprise of myself as well as the



patients, unknown causes of bad breath, nasal discharge, and facial aches and pains. Some of these discoveries of hidden disease have been made when drilling to relieve what was supposed to be simply a low form of congestion of the sockets, which caused but slight inconvenience.

These complications are sometimes so quiet in their nature after drainage has once been established, that there is little to lead one who knows nothing of the patient's history to a knowledge of the true condition of the parts involved. So much is this so, that were I not in the habit of perforating nearly every diseased socket that threatens trouble, some would probably escape notice and perhaps remain through life.

While it is sometimes possible to cure antral diseases without extraction of the offending teeth, yet the danger of failure is so great that I think it does not pay to make the attempt, because even if it be once cured, the possible rekindling of the abscess may occur and again jeopardize the chamber. To remove the cause is a long stride in successful treatment.

In the normal condition of the antrum it has an outlet into the nasal cavity, situated a little above the floor of both, so that while the head is upright the antral chamber may be partially filled before it will overflow into the nasal cavity; but if the membranous coverings of the walls of the cavities be swollen, this natural outlet may be partially or even wholly closed. I have had cases that were entirely closed when they came under my care, so that their only means of discharge was by the aid of an aspirator.

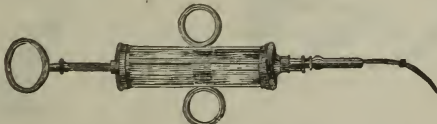
Even when this natural window (drain) into the nares is open, the contents of the chamber sometimes become so thick in consistence that they will not drain off properly, even when water has been forced into the cavity, as has been shown by the subsequent use of the aspirator. In fact this is sometimes the only means of ascertaining positively whether or not the antrum is free from obnoxious matter. I have extracted pus of the most offensive character in cases which have been supposed by others to have been cured.

*Instruments.*—Finding no instruments in the market that suited me, I made a few after my own notion. The aspirator consists of a nickel-plated framework with glass barrel, and although the action of the

Fig. 1.—Farrar's antral aspirator.  $\frac{1}{4}$  diameter.



Fig. 2.—Syringe.



instrument is the reverse of that of the ordinary syringe, the manner of using it is similar, and is easy and rapid, requiring only two or three seconds to evacuate the chamber.

To prevent irritation, the oval end of the nozzle is closed like the end of an egg, but has several small jet holes on the sides, about one-eighth of an inch from the end. This closed end not only allows the nozzle to enter the antral chamber without causing pain or irritation, but obviates the liability to become clogged by being in contact with the tissues of the walls of the antral cavity, as frequently occurs with an ordinary tube.

To prevent injury from the violent forcing of the nozzle against the walls of the chamber, or its thin roof of soft bone, there is an adjustable gauge-collar soldered to a sleeve which slides back and forth on the body of the nozzle, and which is capable of being firmly set at any desired point, on the principle of the universal clamp. (Fig. 3.)

Fig. 3.—Sectional view of Farrar's straight adjustable safety tube.



In construction, my injecting syringe, Fig. 2, is similar to the ordinary form found in the shops, but with a nozzle similar to that described for the aspirator, closed at the end, with four or more small holes through the sides for spray jets, which, by slight rotation of the syringe while in the act of forcing the fluid into the antrum, will thoroughly wash all its walls.

Besides the straight safety tube mentioned, I use a curved form, which enables the instrument to pass readily otherwise inac-

Sec. 4.—Farrar's curved safety tube.

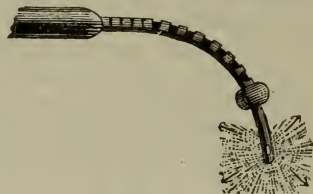
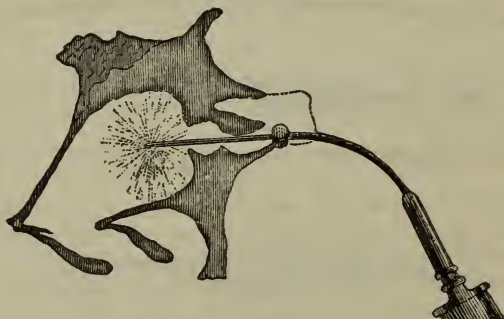


Fig. 5.—Sectional view of the antral chamber, showing position of the spray tube during operation.



cessible routes. The peculiarity of this form lies in the outer sleeve, which, in order to slide around the curve, is made of very thin gold, partially cut at several places along the outer arc of the curve, as shown in Figs. 4 and 5.

In cleansing the antral chamber we should seek to *flood out* the contents by the use of an abundance of water with a syringe of a capacity of not less than two to four times that of the antrum. A single jet, or even several, of feeble force, will not do the work thoroughly, and, when the pus is of a semi-solid or jelly-like consistence, will do little or no good. To avoid choking while the operation is being conducted, it is well that the patient's head should be not only placed forward, but to one side (corresponding to the disease).

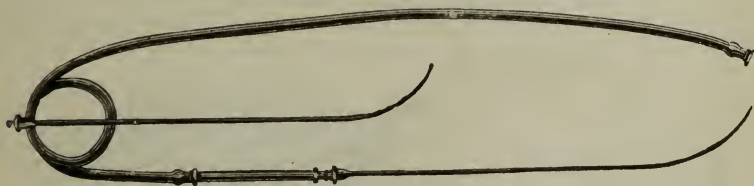
With these instruments I am enabled to treat a case better, easier, and with less pain to the patient, in five minutes, than with the old-fashioned single jet syringe in half an hour. Unless a person has seen these instruments in use, he cannot conceive how quickly and effectually they do their work.

There are cases of alveolar abscess which, although so extensive as to destroy the ossific flooring of the antral chamber, do not penetrate the lining membrane of that cavity. I have had cases where the abscess (which had no drainage) was so extensive that it had forced this membrane covering the floor up into the antral cavity so far that it was in contact with the roof membrane, yet without rupturing it. Of course the treatment of such cases should be so conducted as not to perforate this membrane, because it is much easier to effect a cure, as under such circumstances it is of the nature of simple abscess.

Occasionally the antral cavity becomes diseased from other causes than alveolar abscess. Such cases may require the drilling of a hole through the bottom of the cavity, for the introduction of the syringe nozzle, though this is by no means always necessary.

Fig. 6 illustrates a pair of nasal tubes, right and left, about eight inches in length, slightly spiral, and in shape suitable to pass up the nose between the turbinated bones, into the antrum. These tubes are closed at the ends and made similar to the others; are joined directly to the hub of the syringe or aspirator, or they may be connected by means of rubber tubing about eighteen inches in length. By the use of this tubing there is less liability of causing pain by the jar from the piston.

Fig. 6.—Farrar's naso-antral syringe nozzles.



*Treatment.*—After removing the offending tooth, if no natural opening into the antral cavity can be found, one may be made in the ordinary manner in such emergencies, by means of a drill (not less than one-sixteenth of an inch in diameter) passed into the socket of the extracted tooth.

With the patient's head leaning forward, inject through this opening warm water at the temperature of the blood, and if it does not freely discharge through the nose, it is well to follow this act by the



use of the aspirator, removing the contents, which, when held up to the light, will at once show their nature through the glass barrel. This warm water wash may be followed by an injection of a warm solution of:

R.—Zinci Sulphatis, grs. iij.;  
Morphiæ Sulphatis, grs. iij.;  
Aquæ,  $\frac{3}{4}$  i.

This may cause slight annoyance to the patient for a short time, but beneficial results will follow.

As a change, I have derived benefit from the use of diluted Labarraque's Solution. A weak solution of iodine is sometimes valuable in stubborn cases, where there is follicular enlargement. There is great difference in patients in the use of different temperatures: some do not feel any inconvenience from cold dressings, while others experience agony by the slightest degree above or below blood temperature. On this account it is well to have all solutions used at this degree, commencing with weak ones, and increasing in strength as the case indicates, but stopping short (as a rule) of causing pain. Still, as pain is apt to be caused in the earlier stages of treatment even by the use of water, it should not deter all treatment. Chloride of zinc and water, in solutions from three to thirty grains to the ounce, as circumstances require, is excellent in obstinate cases. Aromatic sulphuric acid, in various degrees of dilution with alcohol, has formerly been advocated, but long experience and numerous trials have led me to believe that this medicine is not to be compared with chloride of zinc in value.

To prevent the drain passage through the alveolar process (when one is made) from prematurely closing, the old and well-known tent of cotton may be used; but as this is irritating and filthy, I long ago abandoned it for a much better device, which I call an antral drain-tube.

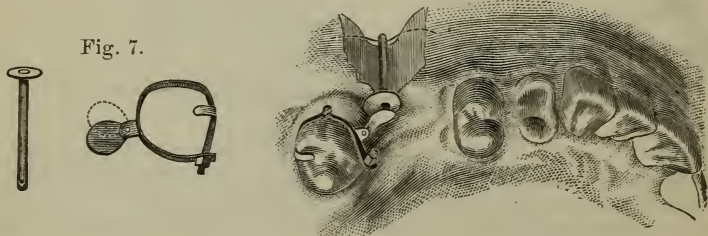
Fig. 7 represents one variety of my drain-tube detached from its retainer.

Fig. 8 illustrates the apparatus in position on a plaster cast.

It is made of platinum or gold. The tube, which is the main desideratum, is about three-fourths of an inch in length,—just sufficient to extend about one-eighth of an inch above the floor of the antrum when in position. The end is made the same as that of the syringe, oval, and closed, with holes at the side to allow pus to pass down if

Fig. 8.

Fig. 7.



desirable. The opposite end of the tube has a flange, like the brim of a man's hat, which prevents it from passing too far into the chamber. Although this is mentioned as a tube, I generally fill it with

gutta-percha, and use it as a plug in order to prevent unpleasant noises by regurgitation of the air when swallowing, during oral manipulations.

The tube shown in Fig. 8 is retained in position by a valve operating laterally, which is connected with a fixture about a neighboring tooth, and plays back and forth on a rivet hinge. This valve also serves as a stopper to prevent food from being forced into the tube.

More simple devices may often be practicable to retain the tube. If there is a cavity in the tooth, it may serve as an anchorage for one end of a small piece of wire, set in a plastic cement, like amalgam or phosphate of zinc, the other end of which may be so bent as to enter the lingual extremity of the tube. In the absence of teeth, an ordinary suction-plate may serve as a retainer.

To inject the antrum, liberate the tube by forcing the retainer to one side; remove the tube, and there will be exposed a smooth round canal, through which the syringe-nozzle may be carefully passed without causing irritation or the loss of a drop of blood. Inject the case, replace the tube and retainer, and the patient is ready to go on his way within five or ten minutes after entering the office. Some patients can treat their own cases with the syringe, and others can actually suck the contents from the antrum, and also force liquid from the mouth up through this canal into the nasal cavity.

These little devices, when properly made, are of great value to both operator and patient in hastening the cure; for with these diseases much depends upon cleanliness of the part, in order to allow nature (who, after all, is the great physician) all possible opportunities to help herself.—*J. N. Farrar, M.D., D.D.S., Proceedings of the Med. Society of the County of Kings.*

**SYPHILITIC ALTERATIONS OF THE TEETH.**—M. Parrot has devoted several lectures to the description of those alterations described by some authors as being of convulsive origin, and by others as of a rachitic nature, while the author regards them as one of the products of hereditary syphilis. The following is a brief outline of the argument used by him to enforce his position :

The alterations of an atrophic nature, belong to a certain number of types which may serve as divisions in description. Parrot first describes cuspid atrophy which does not affect the whole crown of the tooth, but merely its most prominent part,—that engaged in grinding action. Thus in the incisors, it is the cutting part that is attacked; in the canines, the point; and in the molars, the cusps.

The tooth that is more often altered is the first molar (a tooth of second dentition often showing itself before the others have fallen); it is also frequent in the bicuspid of the first or second dentition and for the incisors of the second dentition; it is much less frequent in the canines of either first or second dentition.

The typical alteration is found in the first molar where it is constant, if existing in other parts of the mouth. The altered part seems free in the middle of the teeth and appears on a lower level than the sound part, from which it is separated by a sort of furrow; it seems as if framed in the sound part, from which it differs in



consistence, color and other characteristics. It is yellower, of an ochrey aspect; the cusps are more pointed, and filled with small elevations like grains of sand, and extremely friable. On the other hand, the part of the tooth upon which these altered parts rest is normal, often covered as if with a coat of enamel. The peculiarity of this alteration is the sort of retraction which the tooth has undergone at the same time and which has given rise to the separation between the healthy and affected parts.

Cusp-atrophy manifests itself in other teeth in an analogous manner. The characteristics are less marked in the bicuspid of the first dentition, the retraction is less pronounced. In the canine it is as well shown in the first as in the second dentition; the same is true of the incisors.

The cup-shaped atrophy, next described, may present itself alone or associated with other varieties; it is more particularly observed upon the upper middle incisors. The tooth is generally large and high, and on the anterior and posterior face are observed small depressions of varying numbers, from one to eight. Their diameter does not exceed one m. and they are in a horizontal row, united by small grooves or separated by a fold of enamel. At their level the tooth is not enameled; it is of a dirty yellow and the dentine is often exposed. This form of atrophy is very remarkable, because found in other forms, and seems to be the elementary form of other varieties.

The third form is the sulciform atrophy, particularly studied by M. Magitot. It is rarely found in the molars; it occurs chiefly in incisors and consists in horizontal furrows in numbers from one to three, rarely four, always horizontal and parallel, near the maxillary border. The depth of these is from 0.5 to 1 m.; they are separated by a sort of swelling of the enamel. This variety is often found combined with the preceding; the furrows are formed by a series of small cup-shaped depressions, and in certain cases may occur vertically or obliquely.

A fourth variety is a hatchet-shaped atrophy. This is only observed in the first dentition and only in the incisors and almost always in the superior middle. It consists in a thinning of the middle part of the tooth, whilst the free extremity retains its primitive width, in such a way that the tooth presents the appearance of a hatchet. This alteration is not primitive, being only produced after the complete development of the tooth, while the other forms described commence when the tooth is still in its sac.

The fifth variety is that to which Hutchinson has called attention, consisting of notches, occurring chiefly in the superior middle incisors, but being also found in others. It is known that he has established an important relation between this alteration and certain forms of chronic keratitis which he calls heredo-syphilitic.

All of these varieties may be more or less considerably modified, but they are almost always accompanied by certain consecutive alterations. First of all is the color, which is modified, even in careful persons, becoming yellowish or even greenish. In those exposed to different dusts, these attach themselves to the surfaces of the teeth and give various colors. There is also an abundant deposit of tar-tar. By far the most important consequent alteration is caries.



The molars are lost early, the jaw is atrophied, and spaces, as seen in horses normally, are soon established.

There are, however, changes in the teeth which must not be confounded with those described. Thus at the second dentition, the incisors often present at their free edge saw-like notches; then it may occur that from friction incisors may cut a bevel edge on each other. The hatchet-shape may be determined by a caries. And again there exists normally in some subjects true furrows. It is therefore necessary to be careful in making a diagnosis.—*Journ. de Med. et de Chirurg. Prat.*

**TRIGEMINAL NEURALGIA.**—Dr. Seifert (*Berlin Klin. Wochensch.*, 1881, No. 11) publishes three cases of trigeminal neuralgia in which he successfully employed compression of the carotid, as recommended by Gerhart. The compression was made to last from fifteen seconds to one and a-half minutes, and repeated as often as the pain was interrupted, while arsenic and quinine were likewise administered. Gradually the intervals were lengthened.—*London Medical Record.*

**THE TOMATO IN THE TREATMENT OF NURSE'S SORE MOUTH.**—Dr. T. K. Griffith, of Hollyrood, Kansas, has found the tomato, eaten raw, or in the form of a fluid extract prepared from the fruit without the use of heat, a very valuable remedy in the treatment of nurse's sore mouth and "canker." In the *Therapeutic Gazette*, for September, 1881, he states that in the summer of 1874 he was treating a case of nurse's sore mouth with chlorate of potassa, carbolic acid and glycerin, iron, quinine, etc. When the earliest ripe tomatoes of the season came into market, the patient saw them and craved them as food. He directed that she be allowed some; she ate some, and continued to crave them, which craving he allowed her to satisfy. There was a marked improvement in the case from this time; the mouth healed, the appetite returned, and the patient gained strength. Since then he has employed the tomato in a large number of cases, and always with the same success.—*Med. and Surg. Reporter.*

**THE DENTAL PROFESSION IN ENGLAND.**—The Dentists' Act, 1878, provides: that only persons who are registered under the Act shall be allowed to call themselves dentists, or in any way to lead the public to suppose that they are dentists, or to recover fees for dental operations in the legal courts, under a penalty of 20*l.*

It should be noticed that the practice of dental operations is not forbidden. The notice "Teeth Extracted" will not incur a penalty so long as no title is assumed which would lead the public to suppose that the person is registered. But if credit is given for such operations, the debtor might repudiate the debt, and the creditor would have no remedy against him.

The only persons now eligible for registration under the Dentists' Act are "licentiates in dental surgery or dentistry of any of the medical authorities" who have been specially empowered by the Act to institute examinations in this subject. The only limitation imposed by the Act on the granting of these licenses is that the candidates shall be 21 years of age. The fee for registration, in addition to all other charges, is 5*l.*

The Royal College of Surgeons of England had established

examinations in this subject long before the passing of the Dentists' Act, and its diploma of L.D.S., or Licentiate in Dental Surgery, is deservedly esteemed. The regulations under which this is granted are as follows:—The candidate must pass a preliminary examination recognized by the College. He must be 21 years of age, and must have been engaged during four years in acquiring professional knowledge, and during not less than three years in acquiring a practical familiarity with the details of mechanical dentistry under the instruction of a competent practitioner. There is no regulation forbidding him to carry on these courses of study at the same time. He must also attend one course of lectures by recognized teachers in each of the following subjects:—Physiology, surgery, medicine, materia medica, chemistry, chemical manipulation, and metallurgy; and two courses in anatomy, dental anatomy and physiology (human and comparative), dental surgery, and dental mechanics. He must, at a recognized school, perform dissections during not less than nine months, attend the practice of surgery and clinical lectures on surgery during two winter sessions, and the practice of dental surgery during two years.

The examination is partly written, partly oral, and partly practical. Besides the purely technical matters relating to dentistry, it includes general medicine, anatomy, and physiology, and some branches of pathology and surgery. The fee for the diploma is 10*l.* 10*s.*

The Royal College of Surgeons of Edinburgh, the Faculty of Physicians and Surgeons of Glasgow, and the Royal College of Surgeons in Ireland, grant dental diplomas. The examination and regulations are modeled on the plan of those of the Royal College of Surgeons of London.

Most of the large medical schools now provide the full course of study required by these regulations, the fee for the curriculum being generally not more than 30 guineas. There are, however, some special dental schools which are mentioned below. The lectures on General Medicine, and so on, must be attended elsewhere.

Dental Hospital of London and School of Medicine, Leicester Square.—Total fee 30 guineas. Dresserships and other appointments open free to all pupils who have entered for the entire course. Only specially dental matters are taught here. The student must obtain elsewhere the necessary instruction in general surgery, etc.

National Dental Hospital and College, 149 Great Portland Street, W.—Total fee, 25*l.* 4*s.* Dresserships open. Registered practitioners may attend short terms of hospital practice and single courses of lectures on paying the fees for them, instead of being required to enter for the full two years.

Edinburgh Dental Hospital and School.—The hospital is in 30 Chamber street. Fees, for two years' hospital practice, 15*l.* 15*s.*; lectures, 4*l.* 4*s.* a course.

Dental Hospital of Glasgow, Anderson's College.—Fee for two years' practice, 10*l.* 10*s.*; lectures, 2*l.* 2*s.* a course.

Dental Dispensary, Octagon, Plymouth.—Fee for the entire dental curriculum required by the Royal College of Surgeons, 23*l.* 2*s.*—*The Chemist and Druggist.*



## HINTS AND QUERIES.

"He that questioneth much shall learn much."—BACON.

CORRESPONDENTS desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

WHAT are the causes which produce grinding of the teeth during sleep, and what should be the treatment?—W.

WILL some one inform me through the DENTAL COSMOS of the best way to keep instruments from rusting?—F. C. S. M.

RETENTION OF DECIDUOUS TEETH.—Miss A. B., aged twenty years, has never shed her deciduous first molars. They are sound and healthy, except one. The first bicuspid has been erupted; the second have not. Would it be proper to extract the temporary teeth?—M. A.

WILL some one tell me what is the difference, chemically, between soft and dense teeth? Where can a comparative analysis be found? Is it true that there is less calcium phosphate in soft teeth than in the best varieties.—A. MORSMAN.

IN answer to T. K. in the October No. of the DENTAL COSMOS, I would say that the best thing would be to drill into the pulp-cavity. The chances are ninety-nine to one that the pulp will be found to be dead. In such cases there is no need to fear anything from drilling the tooth on the labial surface; if the pulp proves to be healthy and in good condition, the small cavity made by the drill can be easily filled. Such cases as T. K. describes, with similar indications, are rare. There is usually something abnormal which leads to the above conclusion; yet I would not hesitate to drill the tooth, as no harm whatever would arise from such a procedure, and it would almost certainly lead to the cause of the trouble.—LOUIS OTTOFY.

IN the DENTAL COSMOS for August, 1881, F. T. Grimes, M.D., D.D.S., asks:

*First.*—"Is dentos positive or negative to all the metals?"

This is a question which cannot be answered, no experiments of an exhaustive or reliable nature having as yet been reported on this subject. Lists have frequently appeared in which the so-called dentos was made to take a certain position in the electro-chemical series; but results alone are of no scientific value whatever, unless the instruments and methods employed to obtain them have been laid before the world and adjudged faultless. This most essential part is as yet wanting, nor is it possible, according to Professors DuBois-Reymond and Christiani, of Berlin, to see how one is going to approach this subject with any assurance that the results obtained will be anything like the true ones. We should, moreover, bear in mind what every one seems to forget, that the solids of the tooth are non-conductors, and the liquids alone conductors. In the same way a piece of porous earthenware, itself a non-conductor, permits of the passage of an electric current when it is saturated with a conducting liquid. No one could think of attempting to place the earthenware in an electro-chemical or potential series; yet the chance of success would probably be as great with it as with dentos.

*Second.*—"Can there be a positive electric current without or in the absence of a negative current?"

No. Whenever electricity is produced, either static or current, it is invariably found that equal quantities of positive and negative are produced. A unit of positive electricity can by no possible means, according to our present knowledge



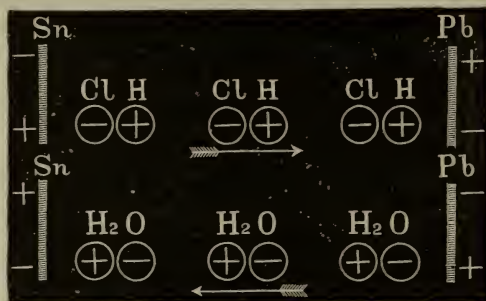
and theories of electrical phenomena, be separated without at the same time liberating a unit of negative electricity. And after the battery has been in action for one thousand years, if you please, there will not be a unit more of positive or negative electricity in the world than at the commencement. It would be as easy to construct a magnet with only one pole as to produce a positive electric current without its corresponding negative one. See Jenkins's "Electricity and Magnetism," second edition, page 8, and Wiedemann's "Die Lehre vom Galvanismus und Electro-magnetismus," zweite Auflage, erster Band, erste Abtheilung, Seite 50.

*Third.*—"Is the current produced at the expense of decomposition of the positive or negative element or both?"

The electric current is produced at the expense of the positive pole—i.e., of that pole from which the positive current sets out through the liquid. The negative pole is either not acted upon, or, if it is, it does not thereby add to the strength of the current; it may sometimes, as in the Daniels cell, increase by deposition upon its surface.

*Fourth.*—"Can the menstruum used to excite the battery be so changed as to reverse the current, or in other words, convert a positive into a negative current? and what alteration is necessary in the exciting liquid to produce this change?"

The direction of the current from a cell of low electro-motive force may be often reversed by the change of the fluid. Thus, tin and lead in hydrochloric acid, fifty per cent., give a current setting out from the tin through the liquid; whereas, the same metals in water produce a current setting out from the lead through the liquid—i. e., in the opposite direction. The accompanying familiar diagram from Wiedemann, may serve to illustrate the two cases.



In the first case the tin, having a stronger affinity for chlorine than lead has, and a stronger affinity for chlorine than for hydrogen, determines the evolution of hydrogen with its load of positive electricity on the surface of the lead, and thereby determines also the direction of the current *from tin through the liquid to lead*.

In the second case the lead, having a stronger affinity for oxygen than for hydrogen, and a stronger affinity for oxygen than tin has, determines the evolution of hydrogen with its load of positive electricity on the surface of the tin, and hence the direction of the current *from lead through the liquid to tin*. We may say, then, that the direction of the current may be reversed by so changing the liquid that the affinities of the electro-negative constituent of a molecule of the liquid for the two poles will be reversed. The direction of the current may be reversed, sometimes more than once, without any change taking place in the solution. These phenomena are too complicated and numerous to allow of an

attempt at explanation here. One instance must suffice. In a tolerably dilute solution of sulphide of potassium, iron and copper give at first a current from iron to copper through the liquid. This current diminishes gradually in intensity to 0, and then changes in direction, going from copper to iron through the liquid. This change is due to the chemical action of the liquid upon the metals, covering them with thin coatings, which, for the liquid in question, follow each other in the electro-chemical series in an order the opposite of that of the pure metals. Vide Wiedemann, 530-80.—DR. W. D. MILLER, *Berlin*.

UGHT THE PRACTICE OF DENTISTRY TO BE REGULATED BY LEGISLATION?—Under the above title, Dr. Wm. Barker, in the October number of the *DENTAL COSMOS*, argues the case at length, and concludes that legislation is not competent. Theoretically he may be correct, but practically and morally he is wrong.

In speaking of the parental nature of government he says, "This doctrine that it is the duty of the State to protect the health of its subjects cannot be established, for the same reason that its kindred doctrines cannot, namely, the impossibility of saying how far the alleged duty shall be carried out." That, to a certain extent, government is parental is witnessed by the insane asylums, hospitals, almshouses, pest-houses, and other eleemosynary institutions that abound.

He says, further, "Provided they (the goods) are not as represented, the punishment of the seller lies in the loss of patronage, which, sooner or later, is sure to follow." Would that console the man who had lost his wife through defective plumbing, or the blunder of an ignorant druggist? Would that restore her to her family? How many persons are capable of judging of the quality of *all* the services and goods they purchase? Perhaps one in a hundred. How is the purchaser to know that the steak or milk he buys is not infected with poison that will destroy his life? How is he to know unless the government appoint men to inspect them? In like manner how is he to know whether the dentist is qualified to treat him unless a license law is in full force?

This quibbling over technicalities is what allows murderers to go unhung, and is a disgrace to our civilization, and the sooner an end is put to it the better. No one can deny that a great deal of injury is annually inflicted by the incompetents in the profession, and why not use every effort to eradicate them?—WM. D. KEMPTON, M.D., D.D.S.

WHAT IS THE MATTER?—In an article with this caption (*DENTAL COSMOS*, September, 1881, page 463) there is placed before the profession as the *opposites* of an "extremely simple system" the one assertion "Gold, of course; that is the only filling fit to go into a person's mouth" and the other "anything but gold; it is the poorest filling-material known. In proportion as teeth need saving, gold is the worst material known." These opposites (?) are followed by the query, "can any man with ordinary common-sense fail to see that such methods and answers are narrow and small below measure."

As I fail to see anything in this except the smallest possible appreciation of "what is the matter," I desire to enter a protest against such propositions and deductions.

If the writer had stopped with the two antagonistic enunciations, "gold is the only filling fit to go in a person's mouth," and "gold is the worst material known," all would have been well enough as an illustration of narrow-mindedness in dental practice, but when he adds to that the enunciation referred to, he oversteps the mark most decidedly.

The statement "In proportion as teeth need saving, gold is the worst material

to use" is only comprehended by those who are most broadly educated as to "what is the matter," and just "in proportion" as one is fully competent to recognize "what is the matter," is one impressed with the breadth and the truth of this enunciation.

If, in a tooth of dense structure, there is a small cavity of decay, in a perfectly accessible position, there is, so far as I know, but one opinion as to the proper material with which to fill it. Under such circumstances gold is the *best* of all filling-materials.

If, in a tooth of wretchedly poor structure, there is an immense cavity of decay in a dreadfully inaccessible position, there is yet much discussion as to the material and method of *best* filling it, but all experience goes to show that gold is the most difficult, the most tedious, the most painful, and the most expensive material with which to make a filling—that it is the most dangerous to the pulp, as far as regards conductivity, and that it is *not always* the most durable.

The record of gold in such cavities is not an enviable one, but on the contrary it is neither respectable nor satisfactory.

Therefore it is that it has been said, "In proportion as teeth *need saving*, gold is the worst material to use." A proposition which is so far from being "narrow and small below measure," that it is itself, by its misrepresentation or its full comprehension, the *just measure* of each man's capability of forming a correct estimate as to "what is the matter."—J. FOSTER FLAGG, D.D.S.

NERVE REGENERATION.—It is really singular how much the nerves may be mutilated and broken up, and yet ultimately recover. A friend of mine, who was a carpenter by trade, enlisted in the late war, and was promoted to Captain in the 1st Maine Cavalry. In one of the most bloody engagements of that regiment he received a bullet wound in his left arm. The bullet entered about two inches below the axilla, and passed through near the inner side of the bone, cutting the median nerve entirely off. The hand was paralyzed and bent inward. The wound was very painful and a long time in healing. For several years the arm was useless. At length he found it strengthening, the pain and tenderness disappearing, so that he could do something with it by way of assisting his right hand in carpenter work. After about four years it acquired a good degree of usefulness. At this time it is nearly fully restored, and he is a skillful and active workman. One could hardly have predicted so complete recovery after so destructive an accident.—E. CHENERY, M.D.

PARALYSIS AFTER EXTRACTION OF A TOOTH.—In the periscopic department of the DENTAL COSMOS for October, there appeared an extract from the reports of the Odontological Society of Great Britain, under the above heading:

I desire to say that I have seen something of the kind three or four times, but was more particularly struck with a case which presented about a year ago. A young married lady came to me for the extraction of the right lower first bicuspid. There was no trouble in the removal of the tooth, but a week later she returned, saying that there had been no feeling in the lip and flesh below since the tooth was taken out. I examined and found the tissue paralyzed at the part opposite the place where the tooth had been, and extending forward an inch and a half; thence directly downward to the angle of the jaws; thence backward an inch and a half, and up to the starting point—describing an exact parallelogram. I am not able to account for such an extent of paralysis. I told her it would gradually come right, and have not since heard from her, which I should have done had it not got better.—E. CHENERY, M.D.



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No. 12

ORIGINAL COMMUNICATIONS.

LIBERTY WITHOUT LAW IS LICENSE.

BY W. P. CHURCH, D.D.S., PROVIDENCE, R. I.

Read before, and printed by request of, the Rhode Island Dental Society, in reply to the article read at a previous meeting, "Ought the Practice of Dentistry to be Regulated by Legislation," printed in the DENTAL COSMOS for October, 1881.

It must be a matter of sad encouragement to those who look for an ultimate perfection, or for that time when each man's government of self shall form the government of the whole, that human nature does never radically change; that man is in the main the same to-day as he was in the beginning, raised somewhat by education and the experience of the past, but still as prone to go astray from right, and so quick to fall back into barbarism that we often tremble for the progress made.

The self-styled "free-thinking" social scientist lures us with promises and prospects of liberty—liberty in its widest sense and utmost range—in the exercise of our individual will, as opposed to everything like obedience to law and government. The tendency to this sort of thing is painfully apparent in the arguments of the author of "Ought the Practice of Dentistry to be Regulated by Legislation?" Says the article before us, "Government may be looked upon as a kind of necessary evil." Regarding it as an evil, even though necessary, the natural drift is to have as little of it as possible; and, of course, in the ultimate, to do away with it altogether, leaving the race untrammelled in the exercise of liberty.

To love liberty is as natural as to love life. It is born in us—a spontaneous impulse. Hence the fascination of the sophistries of this class of reasoners. As a matter of fact, there is no such thing as absolute liberty or freedom of will. Man, from his nature and condition, must serve. There must be a dominant power. "Every man has freedom to do what he wills, provided," *that he wills to do*

*what is right.* The law must govern him, as all ideas of absolute liberty are a delusion and a snare.

In all ages men have found it necessary to have some theory about right and wrong, some scheme for the conduct of life. The theories of right and wrong are the bases of the moral law; and moral law is the foundation of society. Society cannot exist without the acknowledgement of some such law; and without an attempt, however confused and inadequate, to carry that law into effect. This carrying of the law into effect is government, without which the law does not exist, consequently neither does society; and man without society sinks to the level of the beast. Thus it will be seen that our whole fabric of civilization depends upon law and government for its support. Is this an evil necessity? If any one wishes to know on which side the evil lies, take away the law, for a single instance, in the commercial world; let men forget justice, honesty, and truth, and witness the confusion and panic which ensue.

Human law is also divine law, for law is not a thing made by man, but gradually discovered by him. It was all in the plan at the creation, and has been little by little adopted by man as he progressed in civilization and morality. And still the silent finger of experience points to a further morality, not attained but recognized; and by this would we answer the writer, when, in his misconception of government and his consequent obscurity, he asks, Shall we have more government? We shall have more and more, as we find or attain more and more good and true laws which are to be enforced.

But, says he, "the good and true need no law." How does he know this? The law makes them good and true; for, as was said above, without law man sinks to the level of the beast. To the good and true the law is a beneficence; they feel no lack of liberty or any sense of restraint; their obedience to law is as easy as is the beating of the heart in obedience to physical laws. Their need of the law in the sense of protection is too apparent to need discussion.

That legislative enactments are sometimes oppressive or unjust, and worse than useless, does not prove that government is an evil. Man's steps in the line of progress are always forward and backward, but onward if he use the light given him; and those same legislative acts, so derisively alluded to by our opponent, most probably served their purpose, as the step backward to gain impetus to a state further onward.

Hooker says: "Of law there can be no less acknowledged than that her seat is in the bosom of God, her voice the harmony of the world; all things in heaven and earth do her homage, the very least as feeling her care, and the greatest as not exempt from her

love. Both angels and men, and creatures of what condition soever, though each in different sort and manner, yet all, with uniform consent, admiring her as the mother of their peace and joy."

After a long course of elaboration and discussion, during which morals, mathematics, and physics are squeezed of everything which may appear to support him, the writer in question arrives at the conviction of what he styles his "first principle" or moral axiom, to which all kindred social questions may be referred, and by which they may be decided, viz.: "Every man has freedom to do all that he wills, provided he infringe not the equal freedom of any other man." An axiom is a self-evident truth. Is this truth? and is it self-evident? The writer proves the contrary by trying to demonstrate its self-evidence (?), and then leaving it an unsolved problem. Unsolved because he has not proved his right to the premises. To be sure, ground enough has been gone over, but a person gains no right or title to real estate by "straddling" over the locality. We are led to inquire by what right one man can originate an axiom, and a moral axiom at that. Surely, according to the principle of "equal freedom," any other man has the same right, and the disputes and confusion resulting would be equaled only by that at Babel.

By combined quotations from our national Constitution and Herbert Spencer, it is made to appear that the pursuit of happiness is the chief end of man; consequently, if there is any principle in the above quoted axiom (?), and that principle is correct, "the happiest man will be he who has the clearest intellect to calculate his own interests." Is there here any equality of freedom? Has the maxim, "Equality of rights is the first of rights," been forgotten? Evidently this has all been forgotten, and self is the only interested party.

We claim, however, that this "first principle" or moral axiom is an absurdity, not possible of practical application, and consequently contains no principle. What is meant by "any other man?" Surely it cannot be restricted to the generation present, as every instinct of humanity cries out against the right of a parent to do a thing which he knows will endanger the happiness of his offspring yet unborn, though the act may not infringe the equal freedom of his cotemporaries. This being the case with one succeeding generation, it must be so with another, and another, and so on indefinitely. The full results and final value of an act are never finished in that act, but go on into remote time and complications where none but infinity can follow. To in any way judge what man has freedom to do, with the condition entailed, requires more than finite knowledge; and we are consequently thrown back again for guidance in our acts upon infinity as expressed in the law.



In the examination of the workings of the legislative enactment in a supposed instance, it seems impossible to make out a case without using the words trade and profession as synonymous. Trades and professions differ in the very essentials which are necessary for their joint application in the case cited. We regard every legitimate occupation as honorable; but, from the nature of the different occupations, and the qualifications and responsibilities attached, some are more honorable than others; and these more honorable occupations, requiring special intellectual training and a higher sense of duty, are professions.

A trader may exhibit his wares or the products of his labor, and aided by his own knowledge of the articles and of his own requirements; the patron may purchase with little fear of being wronged; at any rate, he bought what he previously examined, and probably had the opportunity to test.

With a professional man there is no such opportunity for exhibit and examination by patrons. Has a lawyer, a clergyman, a physician, or a dentist, a single thing in the line of his profession to exhibit, which bears any analogy to the products of the mechanic's skilled labor, or the goods of the trader? Manifestly nothing! The patrons of the professional are forced to rely upon his qualifications for the profession, and upon his honor to use those qualifications for the best good of those seeking his services.

The necessity for proper qualification and sense of honorable duty in the professional man makes it specially apt that the law should afford protection to the educated and honorable practitioner; thereby raising the standard of the profession by stimulating honest zeal, and weeding out the ill-qualified and unprincipled; and more than all else protecting the public from extortion and imposition.

Protective legislation, in a greater or less degree, is in force in most of the departments of life, and in the main the results are undeniably excellent. We will enumerate a few cases as examples of this.

The State assumes the right to say who shall practice law; otherwise there would be no end of trouble, as may be plainly seen; it assumes certain regulations as to the clergy; it recognizes, officially, only such physicians as have qualified themselves to a certain standard; it organizes boards of health; recognizes the "cruelty to animals" and "cruelty to children" societies; requires the qualification of engineers and pilots, and regulates the conduct of railroads and steamboats, etc. Every year such protective measures are growing in number, and the popular voice approves the act, and finds neither "insufficient nor fallacious data" in the process of enactment. How far such protective legislation may proceed must be determined

by the laws of justice; of justice man to man, and of justice to man as a man.

One of the grandest schemes of civilization is the division of labor, each one contributing his part toward the completion of a perfect whole. By the division of labor a man devotes his whole time and abilities to some one particular calling, and the results are the perfection of that calling to the extent of human ability, and the development of numberless improvements and new fields of labor; consequently the serving of our fellow-man better than by other means, and the being served better by him in return. This state of things necessarily leaves the greater part of the community in more or less ignorance of the details of the occupations of the others. Is it right or just that this necessitated ignorance, in which all are sharers, should be taken advantage of by the knowing ones? By no means. Every moral sense within us condemns the scoundrel who would so impose upon his helpless fellow-men.

The course advocated in the article under discussion, viz., the total non-interference of the law to protect the weak and ignorant, will result, it says, "in the growth of a race who shall both understand the conditions of existence and be able to act up to them; partly by weeding out those of lowest development," etc. "The weeding out," that is, "the survival of the fittest," or the killing off or allowing to die from neglect of all who have not the strength, physical or mental, to keep up in the race of life. Such an idea we hold to be a grave evil, especially when voiced by a member of the healing art.

The greatest achievement of civilization is the respect for life. Nations rise in proportion to their protection of life and property; consequently the advocacy of this idea is against civilization and humanity. We earnestly desire for the human race the highest physical, intellectual, and moral type, *combined*, that civilization can produce, and we would do this in accordance with civilization, not by "weeding out" or stamping out the objectionable types; neither by this do we advocate the other extreme, that of propagating evil and disease in order to exercise our morality and science; but, rather by *curing* disease as effectually as possible, by precluding poverty and preventing suffering by such means as shall thoroughly eradicate them, by proper instruction for the ignorant and proper regulation of the idiotic and defective.

One more word in regard to that millenium of the "free-thinker"—self-government or the "the reign of reason." As a matter of fact, reason alone has never, and never will, govern the world. The chief difficulty of self-government is the passions, and as well try to hold a wild beast with a thread as the passions by reason. "The

passions can be governed, but only by means of the passions. A man can not become good simply by suppressing his passions. If the evil passion be strong, the good passion must be stronger to overcome it. A man's heart must be won from evils before he will leave those evils."

### CONCERNING DENTAL COLLEGES.

BY J. FOSTER FLAGG, D.D.S., PHILADELPHIA, PA.

THIS caption, having become somewhat familiar through the efforts of the editor of the *Dental Register* (July number), and of Prof. Joseph Richardson, of the Indiana Dental College, it seems to me appropriate that the discussion of the subject should be continued under it. I recognize that peculiar circumspection should attach to the utterance of views in relation to this matter by any one who may be thought to be biased by faculty membership, and I therefore desire that my faculty associates shall in nowise be accredited with any responsibility for that which I shall offer, but that my conclusions shall be received as purely individual.

I have, for the past few years, noticed the directed tendency of the American Dental Association in its proposed *management* of dental education with feelings of increasing distrust and disgust. I have distrusted it from the appearance of favoritism with which it seemed to me to be possessed, when I was a looker-on and had no special interest in any school, and never expected again to have. I was disgusted with evident effort at usurpation on the part of a committee, the practical knowledge of which, in educational matters, I knew to amount to nothing. I distrusted the truth of the assertions regarding the benefits to dentistry, which were to accrue from the leadings of gentlemen who never had traveled one step in the path they would direct. I was disgusted at the mere mention of coercion, by penal enactments, of those who had conscientious difference of opinion upon an evidently debatable question. I spoke as an individual having no interest, except that which I regarded as the good of my profession, in antagonism to the *spirit* and *tendency* of the movement. I spoke against the *time* requirement as weighed in the scale against *merit*. I spoke in favor of increasing demands for knowledge as the facilities for impartation increased. I spoke for that which I regarded as the standard for the gradual elevation of dentistry, as evidenced by the growing meaning of its "D.D.S.," and then I advocated the bestowal of the degree *solely* on the basis of possession by the applicant of the requisite amount of knowledge and the requisite degree of skill.

Of this, it seemed to me, the faculties of the various schools were



naturally the best judges. I was not a member of any faculty, but I had been, and had learned what I knew of the work in a very expensive and laborious manner. I knew that the would-be dictators had no such work to refer to. I knew that the faculties of medical schools had their varied requirements, and that they were regarded as worthy of trust in examinations; I knew of their reputed short-comings; I knew of their endeavors to improve. I knew that the faculties of dental schools had their varied requirements, and I did not feel that the record showed that they were any less trustworthy than their medical brethren; I knew of their short-comings; I knew of their earnest desires and of their endeavors to improve.

I felt that the good work was going on; that each year showed an advance; that year by year the means for instruction aggregated, and the facilities for the acquirement of knowledge, theoretic and practical, were greater; and I also saw that this was due to the energy and enterprise of those connected with the colleges, and to their full perception of the "needs" for the future welfare of their profession. I saw that this was done while the discussions of the American Dental Association relative to it were practically ignored; I saw that its progress was a thing insured, and that the voice of the committee passed unheeded by the collegiate ear.

The faculties did what *they* thought best, regardless alike of the meddling or the fulminations of the association. At last came the committee report, in which it was, as has been appropriately said, "*unblushingly*" asserted "that this association claims the right to exercise a general supervision over the whole subject of dental education," which report was adopted, and it was

"*Resolved*, That in order to secure representation in this association, dental colleges must, subsequent to October 1, 1881, require all students entering therein to take two full courses of lectures previous to coming forward for examination and graduation, and must also state these conditions in their next annual announcement."

This extraordinary proceeding has produced results *no less extraordinary*. It has demonstrated that "secured seats" are *not* at a premium. It has demonstrated that representation in the *great supervisory* is not desired by such of the "*reputable*" colleges as regard it disreputable and derogatory to their dignity as educational institutions to barter their birth-right for any such mess of pottage. It has demonstrated that neither the American Dental Association nor its educational committee is, in the least degree, essential to the welfare of a large proportion of the colleges of dentistry. It has produced an evident contempt for the action of both on the part of a large number of the best informed and most advanced

members of the profession—men who hold in their hands far more than does the association—the “future” of dentistry; men who, as I have seen it and now see it, have demonstrated a far livelier interest in education than ever has been done by the members of the educational committee; men whose record is of longer standing than is the existence of the association; men who recognize that they largely helped to make it, and who would still have an interest in its legitimate work, but who also recognize that it has had *nothing*, practically, to do with their advancement, and that it has now assumed an attitude which renders it, in their opinion, *an obstruction to their usefulness*.

### REPLY TO “CORRECTION.”

IN reply to Prof. Buckingham, I would state that I derived my information in relation to the official antagonism to Prof. Arthur from a very elaborate account (written by my father) of that, together with a long series of sequences, during which the inception of difficulties (which was, indeed, prior to the attack on Prof. Arthur) was completely lost to view by the comparative magnitude of the later complications.

According to my father's account, the attempt to silence Prof. Arthur was commenced in faculty meeting; was sustained by the power of *four* opinions against *one*; was met by Prof. Arthur with a firm and decided assertion of his intention to continue “from conscientious convictions” his objectionable teachings, and it was settled positively, though informally, that “no interference could be permitted with any teachings, though opposed to generally received views, unless such could be *proved* fallacious.”

To those who are, even in small degree, conversant with the peculiarities of faculty proceedings and “minutes” it will seem rather more strange than warrantable that Prof. Buckingham should think I am mistaken, *because* he can find no record of it “in the books of the college or society;” in fact, the statement which was left was made *because* it was recognized that no other account of many circumstances that transpired between the years 1856 and 1860 would probably exist.

It would seem reasonable to infer that an account of proceedings written at the time of their occurrence and under influences and feelings which then appeared justifiable, might be regarded as reliable authority, even though it did not possess official corroboration; but in addition to this I have a distinct recollection of many long conversations regarding this and many other affairs of that period of which I am quite sure there is no mention in any “minutes.”

J. FOSTER FLAGG.

## PROCEEDINGS OF DENTAL SOCIETIES.

## AMERICAN DENTAL ASSOCIATION—TWENTY-FIRST ANNUAL SESSION.

THIRD DAY.—*Morning Session.*

THE consideration of Section V. was resumed, Dr. Abbott's remarks on the etiology of decay being first discussed.

Dr. Bodecker. Dr. Buckingham, at the session last evening, wanted to know what is inflammation, and in his remarks stated the old doctrine of forty years ago, when the blood was supposed to be the principal if not the only agent in the inflammatory process. This theory has been considerably modified. Virchow said the blood-vessels had nothing to do with inflammation except to furnish material to be taken up by the cells, which he considered the primary seat of the inflammation and the only active agent in its production, inasmuch as they only could produce new cells; pus, in his view, was but the product of the cells. Cohnheim observed that in irritated tissues there exuded from the capillaries and small veins white blood-corpuscles, and he claimed that all inflammation was started by the emigration of the white blood-corpuscles. The fixed cells of the connective tissue do not, according to this investigator, share in the inflammatory process, but they are replaced by the emigrated white blood-corpuscles, which after having passed the walls of the blood-vessels represent pus-corpuscles, and by accumulation form a center of suppuration. Stricker, on the contrary, taught that not only the cells and blood-vessels are implicated in and necessary to the inflammatory process, which he claimed could not be produced in tissues separated from the vascular system, but that the cells swelled so as to kill or absorb the basis-substance; that all the offshoots of the cells may share in the inflammatory process through proliferation. According to this view, every inflammation should result in the formation of pus-corpuscles, which is not the case. All these views were based on only a partial knowledge of the ultimate structure of tissue. It was not until Carl Heitzmann published his discoveries in the microscopic anatomy of the connective tissue that there was any proper comprehension of inflammation. According to him (and his views are now generally accepted as correct) the living matter is present not only in the formerly so-called cells and their coarser offshoots, but it pervades every portion of the connective tissue in the form of a delicate network; hence it follows that it will react upon the irritation, both in the protoplasmic bodies and in the basis-substance. The latter is merely liquefied, the reticulum of living matter becomes visible again, and



thus the embryonal condition of the tissue is re-established; that is to say, inflammation is merely the return of a tissue to its embryonic stage. The embryonal elements (which were originally connected with each other by the delicate threads of the living matter) and their offspring represent what is termed the inflammatory infiltration. By a re-formation of a basis-substance there is a new amount of connective tissue, and the inflammation results in hyperplasia of this connective tissue. If, however, the inflammatory elements are torn apart, the inflamed tissue is transformed into pus. In the former case the inflammation is physiological, and results in a new formation of tissue; in the latter it is pathological, and there ensues a destruction, that is, a transformation into an abscess. Bone-tissue originates from the embryonal elements, which, in the majority of instances, are first formed into cartilage, then back to the embryonal state, and thence by the infiltration of lime-salts is transformed directly into bone. [Dr. Bödecker illustrated the process of tissue-formation by sketches on the blackboard.] The same steps take place in the inflammatory process. When the inflammation commences it dissolves out the lime-salts, and you have the original embryonal tissue. When it tends towards the formation of pus, the connections between the protoplasmic masses perish, and we have the isolated corpuscles floating in a serous fluid. Unless the course of the inflammatory process is changed, these perish, as there are no blood-vessels in the tooth, and decay follows.

Dr. Niles agreed with Dr. Bödecker up to the point where he applied the description to the tooth. The lime-salts are in an acid solution. Does not this act on the tissues to produce the embryonal condition? The idea is nicely illustrated in the absorption of the deciduous teeth. This process takes up not only the lime-salts but the organic matter of the tooth, and you cannot get an acid reaction. The moral is that if you keep your teeth free from acids you will have no decay. [Dr. Niles sketched on the blackboard a tooth with a carious cavity and a living pulp.] In a case like the one illustrated you will find that an effort has been made on the part of the pulp to fill up the tubuli, and thus protect itself. If this is what you call inflammation, the speaker was ready to concede the correctness of the view. If you will neutralize the acid condition, you will stop the decay. This condition may be produced outside the mouth. If you will immerse an extracted tooth in any acid that will dissolve out the lime-salts, and let it remain there, you will have the gelatinous albuminous substance which you call the embryonal elements. You can do it with elephant's tusks or with hippopotamus's teeth, where there can be no inflammation. How do you prepare your specimens?

Dr. Abbott. The tooth is decalcified, and then immersed in a weak solution of chromic acid, to which every few days a small portion of very dilute hydrochloric acid is added.

Dr. Niles. To make a section of a tooth which is being destroyed by an acid, am I to immerse it in another acid? I think not. The cavity will be practically larger if subjected to the action of an acid, and hence I cannot decalcify it and preserve it in the original condition. Dr. Abbott's specimens would show the condition after the immersion, but it was doubtful if this would be the same as before. Magitot and Tomes kept their specimens in glycerin; they do not immerse in acids, but grind down on a fine stone. I think that the process by which these specimens have been prepared may account for all the conditions found.

Dr. Abbott. Dr. Niles, intentionally or otherwise, misunderstands my position. We do not immerse enamel in acids, because we want the lime-salts for strength during the grinding process. We have dissolved the lime-salts entirely out after grinding, and have shown the network of living matter as perfectly under a power of 500 as you can see my hand. It must be understood that we are not preparing these specimens to look at lime-salts. Grinding either tears away or disfigures the organic matter, or renders it imperfect for purposes of observation. The object in putting into the chromic acid (one-eighth of one per cent.) solution is to preserve the organic parts exactly. The solution must not be strong enough to disintegrate the enamel. The moment the living matter is exposed inflammatory action is set up, which is simply a return to the embryonic condition, and from which we may have the redeposition of lime-salts. In the old definition of inflammation, as given by Dr. Buckingham, swelling is noted as one of the characteristic symptoms. If this be true, how are you going to get inflammation in a tooth which cannot swell. The fact is that the inflamed tooth does the same as the inflamed soft tissues. It is reduced to its embryonic condition, from which it may be again differentiated into normal tissue, by the same process which originally formed it. The primary cause is a solution of the lime-salts by some solvent, some acid—something which has an affinity for the lime-salts. Unless this is checked it goes on until a portion of the tooth-structure is destroyed; the inflammatory process passes down towards the pulp, and the canaliculi are enlarged by the melting down of the organic matter, by which the lime-salts are thrown out and held in solution. There is no such thing as a filling up of the canaliculi or vitrification. There is no attempt on the part of the pulp to stop the decay, except that when the inflammatory action is stopped recalcification begins.

Dr. Niles. Dr. Abbott says that when decay begins the lime-salts are dissolved and held in solution; and then when the cavity is sealed the solution solidifies. What becomes of the fluid? You will find around the cavity between it and the pulp a cone of resistance, which is an effort on the part of the pulp to protect itself.

Dr. T. H. Chandler. There is a cone of resistance under every cavity, however small. How do you know that the isolated spots of decay in the figure are caused by the outside action; he doubted if they have anything to do with the caries above. They are probably parts of other cavities.

Dr. Abbott. There is no resistance during decay, but when the cavity is sealed there is a redeposition of the lime-salts. We take it for granted that these lower cavities or pockets are caused by the outside decay, because there is no other probable explanation. They probably have some connection which has been destroyed in cutting the specimen thin enough for use in the microscope.

Dr. Chandler. If it is not a resistance to the decay on the part of the pulp—an attempt to protect itself—why do we so frequently find a lump of secondary dentine in the pulp-chamber?

Dr. Abbott. It is an effort to protect itself. The pulp always protects itself, but it does not attempt to protect the tooth when decay is going on, but when this is stopped recalcification begins.

Dr. Buckingham. Dr. Abbott, as I understand him, almost ignores any vital action in inflammation. Inflammation is pathological, and vitality is necessary for its production. Cut off a piece of cartilage, and it becomes dead and cannot go through the process of inflammation, though it will become decomposed. If dentine loses its vitality we cannot have inflammation, and yet the decay goes on. My idea is that all tissues are formed in a fluid; what this is composed of is not known. Albumen is a solution of lime-salts—97 per cent. water. With this we can imitate the production of bone, but the albumen becomes an almost indestructible substance. The fluid is so nearly neutral that a very little change will precipitate the lime-salts.

Dr. G. A. Mills. The moment decay penetrates to the point where there is a larger amount of living matter, the process goes on more rapidly, because there is a better support for it. The lower the grade of the tooth the less the resistance. Dentine goes faster than enamel. When we can bring the tone of the tooth up to the point where it will resist the inflammatory process we shall have gone a long way in providing against the effects of caries.

Dr. J. N. Crouse wanted to bring up cases which Dr. Abbott's view—that nature does not set up any resistance until the cavity is stopped—does not meet. He had seen cases where there was no



filling, in which decay proceeded until the causes that produced it were done away with. He had seen a cavity in which there was no filling, and in which there had been no decay for sixteen years, but in which the decay was proceeding rapidly, until the tooth adjoining was decayed. He believed that as soon as the sensitive portion of the tooth is reached nature begins to organize resistance. This he had seen without the aid of a microscope. He had seen teeth which were separated for decay in which the surfaces changed their character in a little while, presenting a strong resisting surface. He believed that decay would go on more rapidly in a dead tooth than in a live one; if this be true, the theory that inflammation helps the process will not hold. He had seen decay, as in the case of abrasion, go on more rapidly in a dead tooth than in a live one by its side in the mouth.

Dr. Abbott. It makes no difference how you stop the dissolution of the lime-salts,—by filling the cavity, or cutting out, or how. When this is accomplished, the redeposition will go on, and the resulting formation will be more perfect than before.

Dr. Atkinson had yet to see the decay that would stop at the margin of a cavity without encroaching upon it. In speaking of inflammation, we should remember that there are two kinds of burning—that which makes coke, and that which burns the fuel away, leaving only the ash. In the former case you have the carbon in the position in which it was placed in the original formation. The inflammatory process in a tooth acts in much the same manner. We should rather use the terms liquefaction and re-consolidation. The lime-salts are not carried away. They simply change their molecular arrangement.

Dr. T. W. Brophy, Chicago, thought the process of decay and repair was somewhat as follows: First, the presence of an acid in the tissues sets up the morbid action, which reaches the dentine and invades the filaments of the tubuli; resistance is set up by the pulp, the tubuli fill up, and we get what is known as secondary dentine. Decay and repair are going on always at the same time. A metallic filling will frequently cause exceeding sensitiveness, and from the irritation caused thereby the tubuli begin to fill up. The enamel has less vitality and more resisting power than the dentine, and as soon as the latter is reached the reparative process begins.

Dr. T. T. Moore, Columbia, S. C., would like to ask what was the cause of the decalcification or liquefaction in the teeth of the Irish immigrants after they have been in this country for some time. In the South we could see the same thing. The negro, when working in the field only, had no need of the services of the dentist, but bring him to the house and the decay began in a short time.

Dr. C. N. Peirce, in reply to Dr. Moore's inquiry, said that where there is a change of diet there is often a marked alteration in the character of the teeth. The food of the field hand was sufficiently dense to keep the teeth clean, and to give them a natural stimulus by the exertion required for its mastication. When they were taken to the house their teeth lost these two helps. Mr. Henry Bergh had informed him that cows fed exclusively on slop-feed lost their teeth, because of the lack of functional exercise. Whenever you put your arm into a sling there is a cessation of function, and the arm loses, as a result, a portion of its usefulness. He believes that soft food is one of the most prominent causes of caries. Instead of being properly masticated, and thoroughly insalivated, it is washed into the stomach without any of the exertion on the part of the teeth so necessary to their preservation and usefulness. Dr. Abbott must have misstated his conviction when he says that the lime-salts remain in continuity, and that continuity is re-established by the recalcification. They may be resolidified, but he (Dr. Peirce) does not believe the continuity is re-established. Dr. Abbott also says we never find bacteria in a cavity of decay. If putrefaction exists we have bacteria. You cannot have putrefaction without bacteria. We have had various essays about the leptothrix. He believes the influence of leptothrix is benign, because the reaction is alkaline. Put a portion from a cavity of decay in which there are leptothrix into an acid solution, and it will become neutral from the development of leptothrix buccalis. The cryptogam (the yeast-plant) is the only plant he has ever seen in cavities of decay that has an acid reaction, and this it is which causes the acid reaction—not the leptothrix.

Dr. Taft. We have been told that when the lime-salts are gone we have embryonal material. He objected to the term; it may be the material, but it is not an embryonal condition. In diagram 3 we have an isolated cavity in which there is complete solution of the lime-salts. It has apparently no connection with the outside cavity of decay. There must be such a thing as internal caries to account for cases where there is absolutely no connection. As stated this morning by Dr. Abbott, some connection might possibly have existed which has been destroyed in the preparation of the specimen. There is another explanation. May there not possibly have existed some original defect in the dentine at this point. In almost all teeth we have defects, and there seemed to him only these two possible explanations—either the internal cavity was connected with the external one, or there must have been a defect in the tooth-structure. The course of the discussion would lead to the inference that decay is caused by a formed acid. He apprehended that it is

produced by an acid in its nascent condition, the spread of the caries being coincident with the evolution of the acid which causes it. We frequently see mouths in which we cannot readily find acids, but in which decay is going on rapidly. How can we account for this except on the hypothesis that the agent which produces the decay is formed at the moment the decay begins.

After a desultory discussion the subject was passed.

Adjourned.

(To be continued.)

### AMERICAN DENTAL SOCIETY OF EUROPE.

THE ninth annual meeting of the American Dental Society of Europe was held at the Hotel du Rhin, Wiesbaden, Germany, August 10 to 12, Dr. J. W. Crane in the chair.

At the second and third days' sessions, Dr. St. George Elliott, of London, presided, the president, Dr. Crane, being called away by sickness, and the vice president, Dr. Doremus, being unavoidably absent.

The society had the very great and unusual pleasure of welcoming a number of professional brethren from America.

Dr. Barrett, of Buffalo; Dr. Dudley, of Salem; Dr. Field, of Detroit; Dr. Friedrichs, of New Orleans; Dr. McKellops, of St. Louis; Dr. McManus, of Hartford; Dr. Moore, of Columbia, S. C.; Dr. Shepard, of Boston; Dr. Taft, of Cincinnati; and Dr. Watling, of Ann Arbor, were unanimously elected honorary members.

The president, Dr. Crane, of Paris, delivered the annual address "On Some of the Causes of Deterioration of Tooth-structure." After referring to the recent essay of Dr. Norman W. Kingsley on this subject, the speaker continued as follows: We must then accept the alarming hypothesis that civilization, whatever may have been its splendid triumphs in material and esthetic progress and culture, has not improved the physical condition of man; that the human race in civilized communities has in strength, endurance, and health greatly deteriorated; that diseases, the undeniable results of modern social life, have increased; and that man in the nineteenth century is physically inferior to man in the early ages. I think, gentlemen, that we must acknowledge that modern civilization has introduced influences which have become dangerous to the public health. The refinements of modern social life too often degenerate into an enervating indulgence and luxury, the effects of which we can trace in that soft, chalky tooth-substance which we are daily called upon to treat. The love of ease and sensual pleasure is too often the substitute of country sports and manly exercises of the



olden times. Great cities, with their overcrowded populations, with life beating ever at fever heat, without repose—a ceaseless unrest; the air full of poison from imperfect sanitary precautions; the ever increasing tendency of population to city life; these evils follow the march of civilization, and, to some extent at least, influence the physical condition of the human race. But there is one present starting danger to the public health which has been entirely overlooked, a danger infinitely more to be dreaded than even the crowded houses, and fetid air, and neglected sanitary arrangements of our great cities. The adulteration of our food is a constant peril to public health. When nutrition is insufficient or diverted, and the power of vitality inadequate to resist the destructive agents present, the tooth yields at its weakest point, and caries is the result. Herein we see reasons for caries having begun and then ceased. An eminent scientist, M. Charles Girard, at the official inauguration of the municipal chemical laboratory in Paris, presented certain astounding facts in which I believe you will all be interested. It was learned, with astonishment, that in the articles of daily food, the most necessary and simple, such as bread, milk, and wine, there were often mingled artificial ingredients most dangerous to health and life. Of one hundred and twenty-three samples of wine, only three were pure—that is to say, one hundred and twenty, if not absolutely dangerous, were incapable of either nourishing or strengthening the vital forces; in twenty samples not one single drop of the grape was to be found,—a vile decoction of chemical substitutes most fatal to health. In twenty samples of milk only five were pure; every sample of cider was adulterated to such an extent as to be most hurtful; of beer seven samples out of twelve were falsified, and no hops were employed in their manufacture. Of vinegar every sample was impure. In milk the chemist has found starch, gum dragon, and chalk; in certain samples not a drop of milk could be detected, as it had been made up of the brains of animals, oily seed, the serum of blood, and decoctions of hempseed. Butter was found containing veal tallow, chalk, plaster, carbonate and acetate of lead. In beer, hops and barley were replaced by decoctions of bitter vegetable substances, such as poppies, belladonna, lichens, boxwood, sawdust, lignum-vitæ, and Indian beans, all absolutely injurious to health. Coffee, in many of the samples examined, was found to contain mahogany powder, horse liver, and ocher, the whole flavored with refuse coffee-grounds, and even the chicory was mixed with brick-dust, fine sand, ocher, and toasted rotten figs. Under the form of chocolate Girard has found potters' clay, toasted bread crumbs, the refuse of brown sugar, and impure cacao. As to the wrappings of this chocolate, he found they contained at least

fifteen per cent. of lead. Many of the samples of vinegar were found to contain chloric, oxalic, nitric, and tartaric acids, of sufficient strength to destroy metals. Many samples of wine contained oxide of lead, tannin, chalk, plaster, alum, soda, carbonate of potassium, and a variety of coloring matters all mingled together, and frequently without one drop of the juice of the grape. The fact cannot be denied that immense quantities of the food daily consumed by the citizens of all large cities are so adulterated and falsified as to endanger the health of thousands who partake of it, and this is one of the direct causes for much disease and perhaps death. We can easily conclude that if the matter of nourishment is a question of vital importance to the general health, how much must it enter into the development of muscle, bone, and tooth-substance."

Dr. Miller presented a paper on "Chemistry in Dentistry." The writer refers all decay of tooth-structure, from first to last, to chemical action. A great number of acids are found in the human mouth, under varying conditions, which have a strong affinity for the lime of the tooth, or, in other words, which have the power of decalcifying tooth-substance. This, as far as the enamel is concerned, means total destruction, whereas the dentine, having become decalcified (*the superficial layers* permeated with saliva, which soon becomes putrid, and exposed to the continual action of external agents), in a short time becomes very much reduced in vitality, or entirely devitalized, and then it must go the way of all organic nitrogenous substances, which are brought under the same conditions as to moisture, air, and temperature; it must putrefy, just as a dead pulp putrefies, the complicated compounds breaking up into carbonic acid, water, sulphureted hydrogen, phosphoreted hydrogen, ammonia, and sometimes carbureted hydrogen, and, as secondary products, nitrous and nitric acids. As each layer of dentine is removed by putrefaction, the layer immediately beneath, being subjected to the same devitalizing agents, in turn dies, to be in turn removed by the decomposing process. Decomposition must, of course, be preceded by death. The acids which produce the decalcification are: 1. Brought into the mouth in the administration of medicines. 2. They are regular constituents of the saliva in various conditions of ill health. 3. And principally they are formed in the mouth by lactic and acetic fermentations, probably assisted by alcoholic and butyric acid fermentations. The essayist made experiments showing that acid is developed in a mixture of saliva and particles of food, exposed for a short time at the temperature of the human mouth, also showing that the acid so formed had the power of attacking the inorganic constituents of tooth-substance. The writer did not believe that bacteria alone could either initiate the

process of decay, or continue it after it had been begun by other causes which were subsequently removed, nor is there any such thing as a bacterium characteristic of tooth-decay. All the forms which are to be found in a cavity of decay, including the so-called U-shaped tooth-bacterium, may be found in enormous numbers in the decomposing food, saliva, and mucus on the under surface of a badly cleaned plate.

Dr. Barrett. I have been very much pleased with the paper just read, and can say that I heartily agree with it, except in some minor points. The writer takes the same ground which I had taken on a previous occasion, but carries it out more fully. No one theory will explain all the phenomena of decay; compounds containing nitrogen are always prone to decomposition, and the substances set free enter into new combinations with the teeth. I do not believe that bacteria could inoculate a tooth, but that they are the scavengers of creation, following after, not preceding, decay.

Dr. Elliott. I find an objection to the chemical theory in the fact that decay sometimes takes place on cusps and surfaces where the retention of food and saliva, and the consequent production of acid by fermentation, is impossible.

Dr. Miller. Decay on a smooth surface or cusp, which is kept clean by the action of the tongue, seldom or never takes place unless there is from some cause an acid reaction of the saliva as a whole, and at the same time a structural defect of the tooth at that point.

Dr. Barrett. Isolate a tooth, i. e., keep it free from accumulations of food and mucus, and you prevent its decaying.

Dr. Taft. I am glad that bacteria are being dethroned. A great deal has been said about them as promoters of decay, but I do not think we have anything to fear from that source. All teeth have imperfections, lack of tenacity of life, structural defects, impaired vitality, etc., which render them more susceptible to external impressions. We cannot study the phenomena of decay without taking into consideration the structural character of the teeth. There are three bonds holding the teeth together: first, a structural bond; second, a vital bond; third, a chemical bond. Whatever overcomes these bonds produces decay.

Dr. Miller. Dr. Taft has presented us with three bonds by means of which the continuity of the tooth is preserved. Now, if we rupture the structural bond by grinding a tooth in a mortar, we do not produce decay or anything like it; nor does it give us any hint as to the cause of decay. If we remove the bond of vitality, say by extraction, we do not produce anything in any possible way approaching decay, and dead teeth, removed from the influence of chemical agents, will, as far as we know, last an infinite number of



years. Rupture of the structural or vital bond does not then produce decay. If, however, we remove or overcome the chemical bond, we in the same act produce decay; in other words, rupture of the chemical bond is decay.

Dr. N. W. Williams read a paper on "The Treatment of Pulpless Teeth and Manner of Filling Roots." He said the treatment of dead teeth and filling of roots was much better understood by the profession at present than formerly, and yet there is much ignorance shown on the subject by the great mass of those who are practicing dentistry. In the memory of most of us a dead tooth was thought to be a fit subject for the forceps; at the present day the dentist who cannot save a large per cent. of such teeth, may be considered as being years behind the times. In the last few years a class of dentists has sprung up which has made the wonderful discovery that the proper method of treating diseased teeth is to wrench them from the mouth, treat and fill the roots, and return them to their places. If the operation succeeds it is imagined to be a wonderful thing, and as such is impressed with more than due emphasis upon the mind of the patient; at the same time the dentist, who has the proper knowledge of the treatment of such teeth, will succeed in saving them without making his patient suffer the pain and run the risk attending such an operation. Another ingenious method has been proclaimed of treating these unfortunate members; it consists of a new system of sewerage, by placing a tube in each root connecting with the cess-pool at the end, enabling the patient at will to draw out some of the sweet stuffs that may accumulate from day to day. I saw one of these cases in which the tube had become loose and had fallen out. The patient called to have it replaced. I suggested the propriety of treating and filling the root, but the lady objected, as her dentist had told her never to have the root filled, as she would be subject to alveolar abscess. She said that when she felt pain or soreness, which was frequent, all she had to do was to suck and suck until she brought blood, and then it was all right. In the treatment of dead teeth it is well to avoid one error which many of us, unwittingly, have fallen into, i.e., over-treatment of them. When a nerve has died under a filling, or from any other cause, open up the cavity so as to obtain ready access to each root; then carefully remove everything from them with small, well-tempered broaches, being very careful not to push any of the dead nerve or other débris beyond the apex. Should a particle of this poisonous matter be pressed through the foramen, we may expect trouble. Wash the roots thoroughly by winding small shreds of cotton around a small broach dipped in pure alcohol until there is no further discoloration of the cotton, and there remains no disagreeable odor. If the débris in the roots

be dry, no further treatment will be required, and the roots should be filled immediately. But if there is a discharge of pus, it is better to treat for a few days. At each dressing wash thoroughly with alcohol; also, if the tooth is tender and inclined to periostitis, it is well to leave it open for a few days, after washing with alcohol, without any dressing in the roots. This mode of treatment, I have found, will succeed in almost every case; when it fails, it is very evident that some part of the treatment is at fault. If there be a fistulous opening from the abscess at the apex of the root, force carbolic acid through the root until it shows in the fistula; then fill the root immediately. The material I have found to give the largest percentage of success in filling the roots of dead teeth is the oxychloride of zinc. I mix it to the consistence of cream, introducing it by winding shreds of cotton around a broach, dipping or rolling it in the oxychloride until the cotton is thoroughly saturated, then passing it to the apex, packing it thoroughly until the root is filled, leaving the cotton imbedded in the filling. With this material one is more likely to succeed in filling the root, for the material being in liquid form, with the acid of the shreds of cotton, it passes readily to the apex. Should any portion of the material pass beyond the point it will do no harm; it may cause slight pain, but without bad results. Indeed, I find it desirable in some cases of alveolar abscess, as the chloride will destroy the diseased condition, and effect a cure when other remedies fail. I recall a case where there was a fistulous opening on both sides of a lower molar, which had resisted all treatment. In sheer desperation I filled the roots with oxychloride, forcing it through the apex as much as possible, and filled the tooth immediately. The abscess healed in a few days, without any further trouble. Another case,—a young lady, aged seventeen,—who had nine dead teeth, five of them being contiguous. I treated and filled the roots as above described, the crowns with gold, all within two weeks, with complete success. Under the old system of long treatment I might not have succeeded half as well. Imagine this young lady with nine sewerage pipes in her mouth! There is no operation more trying to dentist and patient than that of treating, day after day and week after week, dead teeth, as is sometimes done. The more thoroughly we clean them, and the sooner we fill them, the better and more successful cases we will have to report.

Dr. Miller. I would like to ask Dr. Williams what would be the result of forcing oxychloride through the foramen in case there is no fistulous opening,

Dr. Williams. That is a question I am not able to answer. I always try to avoid forcing any of the material through the foramen where there is no fistulous opening. Any material which has

ever been employed for filling roots is liable to be forced through when there is a large opening, but careful operators seldom make such a mistake. I believe the medical properties of the oxychloride often effect a cure where other materials would fail.

Dr. Charles Jenkins. I have been in the habit of placing a pellet of cotton saturated with chloride of zinc at the apex, to prevent the oxychloride from being forced through.

Dr. Blount. I have had opportunity of observing a number of teeth treated in this manner by Dr. Williams, all giving perfect satisfaction.

Dr. McKellops. I have tried various plans for filling root-canals, but for some time I have used only a solution of red gutta-percha in chloroform. It is the only material with which one can fill roots perfectly. I have found that it is not always possible to get the oxychloride to the apex, the hardening of the same putting a limit to the time of operating; whereas, with the gutta-percha solution one may take his own time, and with a fine broach work the solution into the most tortuous root; then with a cone-shaped plug of hard gutta-percha press it to the end of the root, or until the patient says "Oh!"

Dr. Barrett. Since Dr. McKellops taught me this method I have used no other. It makes a most beautiful operation, and every one who familiarizes himself with it will be exceedingly grateful to Dr. McKellops for it, as I am. No harm other than a slight, temporary inflammation follows the forcing of the solution through the apex. I have seen cases of very porous teeth, where the whole root has become injected, as it were, with the solution, and thin threads of gutta-percha have come out through the cementum.

Dr. Williams. I should think that that very thing would be an argument against gutta-percha. You want the filling on the inside of the canal, not on the outside. I think I shall stick to the oxychloride.

Dr. Miller. I should like to ask the speaker what becomes of the gutta-percha which may be forced out through the foramen, it not being soluble.

Dr. Barrett. It is absorbed by disintegration.

Dr. C. M. Wright read a paper on the same subject, in which he said that during ten years he had drilled very many small tap-holes or vent-holes under the margins of the gums into aching molars and bicuspsids, in the superior and inferior maxillary arches, and had left these without any further treatment. So large a majority of these teeth are doing well as masticators, that he was not ashamed to tell of this practice. When teeth have been presented without fillings, and when the roots have been pulpless or filled with the putre-



fying corpses of pulps, he has washed out with tepid water and very carefully excavated with barbed "nerve extractors," reamers, etc., fearing that the disturbance may cause active inflammation and pain, especially if the mass in the roots is of a soft, pulpy, and offensive nature. If the canal is small and the contents dry and dusty, he has not the same fear of inflammation, but can ream more freely and introduce immediately a trial filling of carbolized cotton in the canal, and red gutta-percha or wax in the crown cavity. If this causes no pain in a day or two, he does not hesitate to fill. He has records of lead (commercial) cut into plugs with a knife and forced into large roots; of common tin foil containing lead and other impurities; of gold foil; of carbolized cotton and red gutta-percha; of oxychloride of zinc blown and pumped into the canal; of fiddle-strings dipped in creasote; of cotton and sandarac; of cotton and gum copal in ether, etc. In obstinate cases, where the patient gets a swelled face every time he looks through a key-hole, and where careful handling, trial fillings, alcohol, creasote, warm-water injections, permanganate of potassium injections, swabbings of aconite and iodine, private internal swearings with a serene and patient face have been of no avail,—in fact, where from one cause or another well known to him the case is obstinate, and he could not reconstruct the whole physical character of the patient, and clear out the influence of several generations of corruption and weakness; just where some extract and replant, he clears out as well as he can and leaves a vent-hole under the gums, lays a floor of platinum or gutta-percha, and fills the crown. These teeth do half-service for a long time. Dr. Wright concluded as follows: "We are not on the subject of alveolar abscess and its treatment, or chronic periodontitis; therefore I have tried to confine myself to the consideration of the mechanical treatment of pulpless teeth. In conclusion let me say that I am certain we save thousands of teeth now that formerly were condemned without a trial to the lynch process of the forceps and key, and while, as in medical practice, we lose patients or teeth occasionally, more careful *manipulation* is having its good results in saving teeth, and it strikes me that *this* is what we are dentists for."

Dr. Elliott said he had been making a series of very instructive experiments relating to some of the properties of gold foil. Unfortunately, lack of time had prevented him from completing the work. The results will be reported in the course of the winter. One result already obtained shows, contrary to the general belief, that, with gold annealed half an hour beforehand, one may produce a cylinder or plug just as cohesive as with gold annealed at the time of impacting. The cohesiveness was tested by its tenacity or by the force necessary to separate a cylinder of given diameter.

Again, serrated instruments produce a much more cohesive plug than non-serrated ones.

Dr. Blount, of Geneva, read an essay on "The Merits of Soft and Cohesive Gold as a Filling." He said that at the meeting of the American Dental Association held in Boston, the merits of soft and cohesive gold were discussed by many of the prominent dentists in attendance. By a careful perusal of the remarks of these gentlemen, it is plainly to be seen that few of them entertain similarity of views. One gentleman said that "a young man who comes here to learn how to fill a tooth will go home without knowing how any better than when he came." It is not necessary to recapitulate what was said during his discussion, as every reader of the DENTAL COSMOS is already familiar with the views expressed by these gentlemen. In my opinion our greatest failures may be attributed, not to the preparations of gold we have used, but to the style of the instruments. I do say most emphatically that no dentist who uses cohesive or heavy foils can make as perfect a filling with serrated points as he who uses the same preparation of gold with a smooth oval point. One gentleman spoke of the "cohesive gold drawing away from the walls of the cavity, balling or burring up towards the center." That is not the fault of the gold, but the natural result of the use of serrated instruments and the mallet. Every gold beater will tell you that it is impossible to beat out gold into foil with a serrated hammer; your hammer must be oval on its face. The same law applies to our instruments; in order to obtain a lateral expansion of the foil the face of the instrument must be smooth and oval. I propose to present to the association a method entirely new and original in the manipulation of soft and cohesive foils—a method which I am sure every dentist will admit, after a careful and thorough trial, to be the most rational method of filling teeth with these preparations of gold. We all recognize the fact that *soft* foil packed against the walls of a cavity will make a perfect filling, the union of the gold and the tooth being perfect and complete; but we also know that *cohesive* foil packed against the walls of a cavity does *not* always make a perfect filling, because we are never sure that the union of the gold with the walls of the cavity is *perfect* and *complete*. We are also aware that a tooth filled entirely with soft foil does not make as lasting a filling—that is, it does not wear as well—as one made of cohesive foil. We often see a filling of cohesive foil standing as perfect and beautiful as on the day it was made, with the walls of the cavity blackened and decayed around it. We see also fillings of soft foil rough and unsightly, and so soft sometimes that we can easily pierce them with an excavator, but yet the tooth presents no signs of further decay. An experience

of nearly forty years in filling teeth with the various preparations of gold, and by the various methods, with perhaps as many failures—yet, I trust, with an equal share of success—as others, I am free to acknowledge that I never understood the proper method of manipulating soft and cohesive foils until within the last year.

Taking all the recognized facts as I have stated them above, the idea presented itself to me, why not adopt that which experience has taught, viz., put *soft foil* against the *walls* of the cavity, and fill in with hard or *cohesive foil*? It is very simple and very easily done. Then we have the two desirable results which we strive so hard to obtain—perfect adaptation to the walls, and a surface that will resist the force of mastication. What more can we wish, and what more can we accomplish? I will, as briefly as possible, attempt to describe my method of manipulating. It is impossible, in a short article, to enter into all the minutiae, or present the various difficulties to be encountered; but experience and judgment will teach us how to overcome them. It is only necessary to recognize the principle, and apply it according to our light. One important idea, however, should govern us in beginning an operation, viz., to reduce a very difficult filling, as far as possible, to a simple one; this we can best accomplish by filling all the difficult or more inaccessible portions of the cavity first, thus leaving only a plain, simple cavity to finish, which we can do easily and rapidly.

We will suppose the cavity to be an approximal one in a molar or bicuspid. We will commence the operation by lining the cavity, beginning at the cervical wall, which we have already prepared in such a manner as to retain the foundation or starting-piece of our filling. Let us begin with soft foil and fill this point thoroughly, allowing the gold to extend over or beyond the border; continue this lining of soft foil on the lateral walls until we have reached the grinding-surface, all the while allowing the gold to extend beyond the borders as in the beginning. If the cavity at the grinding-surface is V-shaped, line it also. Then we will place a large pellet against the back of the cavity, packing thoroughly and lightly, which will serve to hold the whole in place, and complete the lining process of soft foil. We will use the Varney foot instrument with light blows of the mallet, or any other style of instruments with hand pressure as will best accomplish the work, but let the *pressure be all the time against the walls of the cavity*. Now let us begin again at the cervical wall as before, only this time with cohesive foil, and smooth, oval-pointed instruments, placing a layer of cohesive foil *over* the soft of sufficient thickness to insure perfect solidity. After having thoroughly covered the soft with the cohesive foil, finish the borders, especially the cervical border, completely, as this



can be accomplished more easily at this stage of the operation than after the filling is completed. This we can most readily do with the *flat* side of the instrument, driving the gold over the edge of the enamel, burnishing it down in such a manner as to insure a complete adaptation of the gold to the edges of the cavity. Now we have completed the most difficult part of the operation, leaving only a plain, simple cavity to fill, which may be done very rapidly, as we have no frail walls to retard our progress, they being already covered and protected. We may use pellets, cylinders, blocks, or any preparation of gold that will fill most rapidly and give the hardest surface and the greatest resistance to mastication.

During the whole of the operation let the pressure be as in the beginning, *against* the *walls* of the cavity, however frail they may be; the soft foil yields to the pressure of the hand, and this prevents the danger of fracture, and at the same time gives support and strength to the frail enamel. I present for your inspection a few specimens of teeth filled in this manner, together with the smooth-pointed instruments used, which will give you a better idea than my imperfect description. One of the specimens you will observe is filled on the buccal surface, the lining being of tin foil filled in with hard gold. This combination of metals, without the use of mercury, possesses by reason of some action the peculiarity of hardening or calcifying the soft and chalky enamel and dentine we so often find in cavities in the teeth of young persons. This manner of combining tin and gold will give the same results as that recommended by him whom we all take pleasure in honoring—the pioneer of American dentists in Europe—our much esteemed friend, Dr. Abbot, of Berlin.

Dr. Shepard. Whose gold do you use for lining?

Dr. Blount. Abbey's No. 4 old-fashioned non-cohesive foil, made into rolls and cut into pellets.

Dr. Elliott. I have for some time been in correspondence with Dr. Blount on this manner of filling teeth, and I have had great difficulty in understanding his explanation of the operation until I saw the manipulation itself. From his paper we would be led to infer that he completes the lining of all the walls of the cavity before he begins with the cohesive gold, but that is just what he does not do. He first puts in a pellet of non-cohesive foil on the bottom of the cavity, as described by himself, and then, before proceeding farther with the lining, he makes it fast with a piece of cohesive foil; he then puts a pellet of the non-cohesive gold against one of the lateral walls, and makes it in turn fast with a pellet of cohesive foil, and so on till the whole lining is completed.

Dr. Friedrichs. I use cylinders, somewhat longer than the cavity

is deep; fill the cavity, and then by lateral pressure produce a space which I fill with cohesive gold.

Dr. Shepard. I never allow a student to make use of the terms soft and hard without asking him what he means. These terms are not accurate definitions of qualities. The softest gold is that which has just been passed through the flame. It is impossible to make a pure, clean gold foil which shall not be cohesive, and every foil which does not become cohesive by heating is impure. The only distinction between cohesive and non-cohesive gold is that the latter may be condensed in larger masses because the particles slide upon each other. All failures with cohesive foil are due to the attempt to work too fast or to a lack of knowledge of mechanics. As the foundation arches of a work of engineering support the whole superstructure, so will the series of arches, one upon the other in a large mass of cohesive gold, sustain or resist the force brought to bear upon them in the attempt to break them through, and the gold will only be superficially condensed. Again, I have seen conscientious operators working with a plugger having two right angles, keeping the point directed towards the wall of the cavity, thinking that the force of the blow will be in the direction of the point instead of the shaft. Every angle is a snare and a delusion. I admire the work of Dr. Blount, but I do not think that more than one out of twenty of the average dentists can do it.

Dr. McKellops. The secret of success lies in preparing the cavity properly. I think the operation of Dr. Blount is a very fine one, but I can make just as perfect a filling by beginning with cohesive foil from the bottom as Dr. Blount can with his more difficult operation. I use the hardest gold I can get (platinum gold), and can build it around the tooth like a band. One advantage of hard gold lies in the fact that when the wall breaks away the filling can be filed down even with the wall again.

Dr. Shepard. In comparing the work of the celebrated operators with non-cohesive gold, whose fillings have lasted thirty to forty years, with that of the best operators of cohesive gold at the present time, we must bear in mind that very many teeth which we now attempt to save would then have been condemned to the forceps, and that no operations were then undertaken that would not now be called comparatively simple; hence it is not to be wondered at if, in our attempts to accomplish such difficult tasks, we sometimes meet with failure.

Dr. Barrett. I once spent some time at the establishment of a gold-beater in hopes of discovering the secret in the difference between cohesive and non-cohesive foils. I found out that one could not obtain much information from the gold-beater on this point, but

I did not find out so entirely to my satisfaction the peculiar difference between the two foils. I observed, however, that when the gold-beater's skin becomes foul from impurities, then the gold is liable to come out unequal, and is not cohesive, but after the skin has been purified the gold comes out equal and cohesive. Pure gold ingots will stick together. Each gold-beater has his secret.

Dr. Williams. I have performed a number of operations after Dr. Blount's method, and I am sure that when one has familiarized himself with it he can work more easily and rapidly in this way than in any other.

Dr. Taft. We now save thousands of teeth that once would have been sacrificed, and the dentist who undertakes difficult operations and fails should not be condemned. The greatest care should be used in the preparation of the cavity, and the instruments should never be allowed to come in contact with the walls of the cavity.

#### INCIDENTS OF OFFICE PRACTICE.

Dr. McKellops showed a method which he employs for ligating sugar-loaf teeth. A piece of sponge is put on a thread and moistened with sandarac; it can be made to stick anywhere.

Dr. Williams presented a case of a molar split into halves. The tooth had two small gold fillings on the crown, the pulp was dead, and the pulp-chamber nearly obliterated by a formation of secondary dentine. The patient remarked that the "explosion" of the tooth was accompanied by the escape of a bad smelling gas. He suggested that the explosion was due to the pressure of gas accumulated in the pulp-chamber.

Dr. Miller thought that a pressure of gas sufficient to rupture the tooth would have given rise to the most severe periodontitis, the roots being open throughout. No periodontitis had, however, according to Dr. Williams, been present.

Dr. Barrett remarked that any hollow body, which is ruptured by a pressure of gas from within, breaks at the weakest point; whereas this tooth had split through the section of most resistance. The mystery remained unexplained.

Dr. Barrett presented the case of an osseous tumor of a lower molar. The tumor was entirely structureless; it occupied a position between and external to the roots of the tooth, reaching up on one root one-half, and on the other two-thirds of the distance from apex to margin of gum. It had intruded upon the dentine so as to produce absorption at one point almost to the canal of the root. He requested advice regarding a superior central incisor which had been fractured by a blow, probably diagonally, at a distance of about three-sixteenths of an inch from the apex. The



fractured point had undergone a slight lateral displacement, so that the canal in the two parts was no longer continuous. A fistula had formed in the position of the fracture. The tooth had been painless, but loose, for nearly twenty months. How should he remove the fractured portion of the root without running the risk of losing the tooth altogether?

Dr. Du Bouchet suggested that he might extract the tooth, remove the piece by means of a screw, supposing that he should be able to find the opening into the canal, and then replant the tooth.

Dr. Cohen suggested making a slit in the external wall of the alveolus about a half inch long, just over the apex of the root; this slit to be spread by means of cotton tents until it should be wide enough to admit of observing the piece and operating for its removal.

Drs. Williams and Blount reported similar cases.

Dr. Shepard, at the request of a number of those present, explained the Richmond method of ingrafting crowns, which he considered the one advance made in operative dentistry in the last year.

Dr. Field said he had failed in everything else, morals included, but never in a Richmond crown.

The following officers were elected for the ensuing year:

*President*.—Dr. W. St. George Elliott, of London.

*Vice-President*.—Dr. Benjamin Cohen, of Hamburg.

*Corresponding and Recording Secretary*.—Dr. Willoughby Miller, of Berlin.

*Treasurer*.—Dr. C. M. Wright, of Basle.

Adjourned, to meet the first Monday of August, 1882, at Ostende.

WILLOUGHBY MILLER, *Secretary*.

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## ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

THE regular meeting of the Odontological Society of Pennsylvania was held Saturday evening, October 1, 1881, at the residence of Dr. Dixon, 4055 Spruce Street, Dr. Dixon in the chair.

### REPORTS OF DELEGATES.

Dr. Darby. I attended the International Medical Congress held in London, and was present at many of the sessions of the section known as Diseases of the Teeth, but do not know that I have any formal report to offer. The congress was largely attended by gentlemen from all parts of the world; the number representing our specialty was quite large, and a fine opportunity was afforded for becoming acquainted with men whom America had long known only by reputation. From a social stand-point the International Medical

Congress was a grand success. The profession residing in London did all in their power to make it a source of pleasure as well as of profit to the members who attended. It would be difficult to surpass in elegance the entertainments which were given. There were several papers read before the section on Diseases of the Teeth, some of which were of considerable merit. The one which interested me most was by Dr. Coffin, Sr., upon the "Correction of Irregularities." His methods were very simple and his accomplishments very great. From the vast number of models exhibited and the great variety of cases described, I should infer that Dr. Coffin made a specialty of this department of practice. The chief appliances used were rubber plates and springs of piano-wire. Dr. M. S. Dean, of Chicago, read an interesting paper upon the treatment of alveolar abscess. Dr. Webb also read a good paper upon his method of filling. Dr. Coles, of London, also read an interesting paper. Time will not admit of a detailed account of either. It is probable that they will appear in the transactions of the congress. I was shown while in Paris a very ingenious little lamp for illuminating the mouth and throat. There are times when an instrument of the kind would be very useful to the dentist.

Dr. Guilford. In one of the dental depots in Paris I saw a very ingenious electrical machine designed for cauterization and illumination of the mouth and throat. It was very complete, compact, and cheap, but in my opinion of no practical use to the dentist. I also saw a water globe with an adjustable gas-burner back of it, the whole mounted on a bracket. It was such as are used by some of the London dentists on dark days for throwing a concentrated stream of light into the patient's mouth, and thus enabling the dentist to operate.

Dr. J. Truman. I attended the State meeting, and considering the difficulty attending gatherings of this kind, the meeting of the present year was a very large and interesting one, about ninety being present, a number from New York and neighboring States. A number of excellent papers were read, several of which ought to enter at once into the general thoughts of the profession, but, owing to the bad habit of publishing proceedings in book form, these cannot reach the reader until a late day. The committee on prosecution under the State law made their report, and in both instances where legal proceedings had been carried through they had resulted in the acquittal of the defendant.

#### INCIDENTS OF PRACTICE.

Dr. Darby. I have in my possession models of the upper and lower jaws of a man about 20 years of age; he has never had any

teeth in the lower jaw, and had but two teeth in the upper jaw; these are molars. He is wearing a lower plate with the full complement of teeth upon it, and an upper plate with all save the two molars. The dentist who sent me the models assured me that the person had never erupted a temporary tooth, nor has he ever had any permanent one except the two molars of the upper jaw.

Dr. J. Truman. My attention has been called prominently the past week to the action of arsenic upon the pulps, and I desire to learn the views of members this evening upon certain points that seem to me to require some investigation, and in order to arrive at it I will place the thoughts in a series of interrogatives. First, then, I will inquire, If arsenic be placed in a cavity with a thin layer of dentine covering the pulp, and the latter not exposed at any point, it is well known that the pulp sooner or later is destroyed. How is this effected? That it will pass through the tubuli traversing the soft tissues therein contained and continue its destructive force until the pulp is destroyed is self-evident, but I desire to be enlightened as to the process by and through which this is effected. We have been using arsenic empirically since 1830, and it would seem to be about time to know how it acts to produce the death of the tissue. Does it produce paralysis of the nerve of sensation, and by this means cut off nutrition? Is it carried into the circulation, and if so, what are the limits of its action? Does it in the case cited produce congestion in the pulp, and consequently increased expansion and a more extended inflammation? These are important points, and bear directly on pathological conditions met with in practice. Second, What is the effect of arsenic on partially devitalized pulps? We know that congested pulps resist the action of arsenic to an extent that renders its use in this condition impossible, but I am not positive as to the effect that may be produced when devitalization has been only partially affected. Third, What effect is produced by arsenic when applied to a dead pulp? Could it be absorbed, and if so, would it be possible for this to be extended to the pericementum? A proper knowledge of the effects under such conditions becomes of importance when we remember how common it is for dentists to carelessly diagnose cases presented for treatment. Pain resulting from a slight pericementitis may be mistaken for an exposed and irritated pulp. Fourth, How soon after the application of arsenical paste may it be possible for alveolar abscess to supervene? The answer to this that I would give would be, that pericementitis could not, under ordinary circumstances, take place until decomposition of the pulp-tissue had taken place, and that this would be delayed by the preservative quality of the arsenic. In my observation it cannot be accomplished under



from ten days to three weeks, and the pulp may remain in a state of quiescence for an indefinite period. The query that follows the main question to my mind of most importance is, Would it be possible for alveolar abscess to follow directly from the application of arsenic? My own judgment and experience are in opposition to any such idea. It is not at all uncommon for pericementitis to follow the application, but this is only temporary in character and speedily yields to proper remedies.

Dr. Essig. My impression has been that arsenic is a preservative of dead tissue. As long as arsenic remains in a tooth abscess is not likely to occur from decomposition of the pulp. I have heard of a case in which arsenical applications had been made to a pulp, the patient not returning for six months. The dead pulp is not capable of taking up the arsenic. I agree with Dr. Truman that a careful diagnosis should be made. We should always find out whether or not pain arises from a putrescent pulp. We can ascertain by certain means. If a pulp dies from any cause and air is admitted, putrescence will take place.

Dr. T. L. Buckingham. I experimented several years ago with arsenious acid to find out its action in such cases as Dr. Truman refers to, but I do not know that my experiments resulted in any satisfactory conclusion. The trouble is, we do not know how most medicines act. We know their effects by repeated trials, and as they have acted uniformly in a number of cases, we conclude that they will act in a similar manner in others. If we take morphia, quinine, or strychnine, we know they act differently, and yet they are composed of the same elements and in very nearly the same proportion. Now, if they were decomposed in the system they would be inert as a medicine, for the elements of which they are composed we are eating and drinking and breathing constantly. They must act as a compound by their presence in some manner not understood. It is so with arsenic. It is not a true escharotic which would act chemically like nitrate of silver, but it destroys the vitality by its presence, and decomposition takes place afterwards. When applied to the pulp of a tooth it appears to only suspend the vitality and make it insensible to pain, so that it can be removed; or it may entirely destroy the vitality, so that after a time it will decompose. The effect is not to destroy the composition of the pulp, as a true caustic would, but only its vitality; and it preserves the tissue, so that its decomposition does not take place until the arsenic is removed. I tried experiments several years ago by mixing a solution of arsenic and the albumen of an egg; then boiling so as to coagulate the albumen; afterwards I put it in water and changed the water until not a trace of arsenic was left in the

albumen; I repeated the same with a piece of beef, only I did not boil, with the same result. This corresponds with all crystallizable compounds that are absorbed by animal tissue and do not combine chemically with them. They all may be dissolved out. I think arsenic sealed up in a cavity of a tooth will be dissolved by the fluids and removed before the pulp will decompose, but I do not think the dissolved arsenic would pass through the foramen in sufficient quantity to produce inflammation in the surrounding parts. Dr. Truman has said something about inflammation; we know very little more about it than arsenic. We recognize the phenomenon of inflammation, and know something about its termination, but the cause of this phenomenon is still a mystery.

Dr. J. Truman. Is there any limit in the absorption of arsenic?

Dr. Buckingham. When arsenic is applied in sufficient quantity to a diseased part, or a tumor in a low state of vitality, it produces the death of the part, which is then in an unfavorable condition for absorbing it; and this is probably the case with an ulcerated or inflamed pulp; hence the advantage of using creasote with it, which will coagulate the fluids of the tissue. Cases have been reported where the arsenious paste has been left in the teeth for months without causing serious trouble; when arsenic has been applied to a pulp which has been made to bleed it is more likely to be absorbed.

Dr. Darby. I do not think we understand the action of arsenic upon tissue. The general belief is that it is absorbed by the tissues, and is readily taken up by the circulation. Very little is required to devitalize a healthy tooth-pulp. Dr. Flagg professes to have devitalized ten pulps with the twenty-fifth of a grain of arsenic. He says:\* "Then came the action of arsenious acid, one twenty-fifth of a grain in a piece of cotton; mixed it with acetate of morphia, the whole being in turn mixed with creasote; placed it in a pulp cavity and devitalized that pulp. I made that same application to a number of teeth, and I left the cotton in each for two weeks, and in some, I think, for three weeks. Each one of those pulps I extracted from those teeth painlessly. It was a perfect devitalization of the pulp. They were taken out and held up before my patients, and they were told, 'That is the pulp of your tooth,' and when I held this up, and told them, every one of the ten said, 'Is it possible that you have taken that from my tooth without my knowledge?' If they did not know it, it could not have hurt them much. These pulps were then placed on paper, the terminal ends where the arsenic came in contact with them were cut off, and the remainder of the

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\*New York Odontological Society, regular meeting, extra session, December 20 and 21, 1875.

ten pulps analyzed in a bunch. They were treated by Reinche's test for arsenic, which detects a two hundred and fifty thousandth of a grain, and there was not the ghost of the shadow of a show of arsenic. Now, if there was not the ghost of a shadow of a show in ten pulps, how much was there in one?" Arsenic does not act readily upon an inflamed or congested pulp. To produce the best results all inflammation or congestion should first be removed. In answer to Dr. Truman's third question, I would say that I do not think arsenic would produce any effect upon a pulp devitalized; I should not expect it to act either upon the pulp or other tissues of the tooth.

Dr. Essig. I doubt whether arsenic finds its way through the structure of the tooth, producing inflammation. If it did so, much harm would result on account of the extensive way in which it is used. By watching the effects we may know the results. If it goes through the tissues and affects the pericementum, we will have pericementitis.

Dr. Buckingham. Arsenic is an elementary substance, and can be detected in smaller quantities than any other poison. Some years ago I tested for arsenic in the tissues of a frog that had been poisoned by applying nerve paste to the web of one of its hind feet; I found indications of arsenic in every part of the body, showing that the poison had been absorbed and passed through the whole system. Arsenic may be taken as a medicine for a long time without producing any deleterious effects.

Dr. Darby. I doubt very much whether arsenic goes through the apical foramen of a finely developed tooth. There might be danger in young subjects before complete calcification had taken place.

Dr. Guilford. I would like to know whether it is possible for the arsenic to pass through the dentine and cementum, and cause periosteal trouble. I do not believe it possible, at least, in any reasonable time. If the arsenic is hermetically sealed in a tooth, no harm to the periosteum can arise from it. In the early years of my practice in a country town, a patient came to me from a distance with four pulps exposed in four superior bicuspid teeth. I applied arsenic to each and sent the patient away, directing her to remove the application the next day. She did not do so, and when I saw her again, in four weeks' time, it was still in, and a piece of necrosed septum had to be removed from either side of her jaw. In this case the trouble undoubtedly came from the arsenic oozing out from around the cotton and sandarac stopping.

Dr. Buckingham. It may be absorbed by the dentine. We know it will pass through the dentine and affect the pulp when applied in



superficial cavities, and why not pass from the pulp cavity out into the dentine. It would probably not pass out in sufficient quantity to induce inflammation in the periodontal membrane. We must bear in mind that arsenic, in dilute solution, will be tolerated by the tissues without injurious effect. If nerve paste is applied carelessly, it may get on the gum and cause inflammation of the gum and necrosis of the bone.

Dr. Tees. I seal in all applications with Hubbuck's oxide of zinc, and the solution of chloride of zinc, for sale at the dental depots. This hardens within two minutes, is very plastic, and prevents leakage.

Dr. Jos. Pettit. The patient, of whose mouth this is a model, is a boy aged ten years, who, while in the country about a month ago, fell, fracturing diagonally the left superior central incisor, as you will notice, nearly to the pulp line, so near that the surface is quite sensitive to the touch of an instrument. Three methods of treatment, in cases of this kind, present themselves to my mind. The tooth might, with the help of retaining screws, be built up with gold, but the pulp is so nearly exposed that thermal changes would probably cause its death, with consequent cessation of root development, besides which such a mass of gold is very unsightly.

The crown might be cut off and an artificial one adjusted, but at this age, with the root not thoroughly formed, such a course would not be wise. Probably the most conservative course would be to protect the surface with oxyphosphate, for the purpose of retaining the vitality of the tooth, with a view to permanent operation in the future. I mention the case, desiring a comparison of ideas and the opinions of the gentlemen present.

Dr. Guilford. I would drill two holes in the tooth at the fractured portion, one vertically and one horizontally. In these I would set small pieces of gold wire with oxychloride, and then around these I would restore the corner with oxychloride or oxyphosphate.

Dr. Darby. If possible I should save the life of the tooth until the root is fully formed, and then cut it off, and engraft an artificial crown.

AMBLER TEES, D.D.S., A.M., *Recording Secretary.*

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#### AMERICAN ACADEMY OF DENTAL SCIENCE.

THE fourteenth annual meeting of the American Academy of Dental Science was held October 26, at the Hotel Vendome, Boston, Mass., the president, J. L. Williams, M.D., in the chair. President Williams, on calling the meeting to order, said:

"This society has only arrived at its fourteenth birthday, but it

is old enough to profit by experience. It has seen simple manual skill grow to become less rare than it was two decades ago; though its esthetic application is yet far too uncommon. And there is reason for congratulation on the present awakening of the conviction, held by the founders of dental surgery, that sound opinions and safe practice may be expected only from a thorough knowledge of the principles and sympathies that in health and disease govern the human system, of which the mouth is a most important part. And, I may add, without this knowledge, the finest manual skill may be useless, or, indeed, mischievous. For the axiom in engineering is equally true in this practice, that the greater the skill misapplied the more aggravating the blunder. But by a general zeal for knowledge of the fundamental principles of practice, we may hope for a higher advance than ever. And it is mainly by such knowledge that this academy can deserve its name as a scientific body."

After the reading of the minutes of the previous meeting, the reports of the secretary and treasurer were presented, the former showing that there are now on the roll the names of thirty-two members.

Appropriate resolutions on the death of Dr. Daniel Harwood, one of the oldest members, were adopted.

The following named officers were elected:

*President.*—Dr. T. H. Chandler, Boston.

*Vice-President.*—Dr. George T. Moffatt, Boston.

*Recording Secretary.*—Dr. H. F. Hamilton, Boston.

*Corresponding Secretary.*—Dr. E. B. Hitchcock, Boston.

*Treasurer.*—Dr. L. D. Shepard, Boston.

*Librarian.*—Dr. H. C. Merriam, Salem, Mass.

*Censors.*—C. P. Wilson, J. H. Batchelder, and J. T. Codman.

The annual address was delivered by Dr. F. N. Seabury, of Providence, R. I. At the close of the exercises the annual dinner was served.

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#### CENTRAL PENNSYLVANIA DENTAL ASSOCIATION.

THE following amendment to the constitution and by-laws of the Central Pennsylvania Dental Association was unanimously adopted July 5, 1881:

No person shall become a member or remain a member of this society who will take more than one student at a time, or for a less sum than this society may direct, or for a less period than two (2) years.

No member shall be allowed to take a student until the student shall have come before the Board of Censors of this society, or a committee of three appointed by this society, who will examine him as to character and qualifications; and, that no member of this society shall be allowed to take a student unless he has a library containing one of each of the standard works on all the subjects taught

in a first-class dental school; and the dentist shall be required to have the bones of the head, either separately or articulated; and he shall also be required to have the student recite to him at least once a week; and, that no member shall be allowed to send a student to college until he has been examined by a committee appointed by this association, and if found qualified to enter college they shall grant him a certificate countersigned by his preceptor. And that this society shall not recognize a dental school that regards the spring and fall course equivalent to private instruction, or will admit students without a certificate as above described; and that this society shall not grant a certificate to a member until he has attended two of the regular meetings and contributed an original essay to the society; and then, if the society deem him worthy at the third semi-annual meeting, he shall have a certificate granted him. If a member violate this article, he shall be tried, and if found guilty of the offence he shall be expelled, and his certificate taken up or cancelled, and the cause of his expulsion published in the paper having circulation in the town or place of his location. *Provided*, That this shall not interfere with any student who has already commenced the study of dentistry.

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### CONNECTICUT VALLEY DENTAL SOCIETY.

THE annual meeting of the Connecticut Valley Dental Society for 1881 was held October 27 and 28.

The society voted to hold its semi-annual meeting at Amherst, Mass., unless the executive committee decided to hold a union meeting with the Merrimac Valley Dental Society.

The following were elected officers for the ensuing year:

*President*.—C. Fones, Bridgeport, Conn.

*First Vice-President*.—N. Morgan, Springfield, Mass.

*Second Vice-President*.—O. F. Harris, Worcester, Mass.

*Secretary*.—A. M. Ross, Chicopee, Mass.

*Treasurer*.—W. H. Jones, Northampton, Mass.

*Executive Committee*.—C. F. Stockwell, Springfield, Mass.; J. J. Vincent, Amherst, Mass.; C. W. Strang, Bridgeport, Conn.

A. M. Ross, *Secretary*.

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### BROOKLYN DENTAL SOCIETY.

AT the fourteenth annual meeting of the Brooklyn Dental Society, held October 10, 1881, the following officers were elected for the ensuing year.

*President*.—A. H. Brockway.

*Vice-President*.—Thomas Fry.

*Recording Secretary*.—C. P. Crandell.

*Corresponding Secretary*.—Wm. H. Johnston.

*Treasurer*.—F. C. Walker.

*Librarian*.—C. B. Parker.

C. P. CRANDELL, *Recording Secretary*.



## CENTRAL PENNSYLVANIA DENTAL ASSOCIATION.

THE semi-annual meeting of the Central Pennsylvania Dental Association will be held at Tyrone, Pa., on the first Wednesday of January, 1882, for one day only.

J. D. GEISSINGER, *Recording Secretary*.

## MASSACHUSETTS DENTAL SOCIETY.

THE seventeenth annual meeting of the Massachusetts Dental Society will be held in Codman and Shurtleff Hall, 167 Tremont Street, Boston, Mass., December 8 and 9, 1881, commencing at 11 o'clock A.M.

W. E. PAGE, *Secretary*.

## MISSISSIPPI STATE DENTAL ASSOCIATION.

THE seventh annual meeting of the Mississippi State Dental Association will be held at Jackson, on the third Tuesday in January, 1882. This meeting promises to be one of more than usual interest, and it is earnestly hoped that there will be a full attendance.

GEO. W. REMBERT, *Secretary and Treasurer*.

## BIBLIOGRAPHICAL.

VIERTELJAHRSSCHRIFT DES VEREINS DEUTSCHER ZAHNKÜNSTLER. Verlag von C. Kellberg, Dresden.

This exceedingly neat quarterly of seventy-five pages is issued by the Zahnkünstler Verein of Germany, under the editorship of Aug. Polscher, of Dresden. The contents are varied and the interest well sustained, and it bids fair to take a position in its special department equal to that of the well-known and highly esteemed *Vierteljahrsschrift für Zahnheilkunde*.

The tendency has been growing for years in this country toward a separation of the mechanical and operative branches of dentistry, and in the larger cities this has been practically perfected, but there is none of the bitter feeling nor are the lines as sharply drawn here as in Germany. The reason of this is plain. The laws there clearly define the position of each individual or class of individuals, and there is no appeal from this decision. A man must have complied with certain requirements before he can practice as a Zahnarzt (dentist). As these are beyond the possibility of many, they are compelled to remain as mechanical dentists, and with no hope, let the skill be what it may, of reaching a higher position. Hence the Zahnarzt proper looks down with lofty disdain on the zahnkünstler (mechanical dentist), and the latter returns it with interest. Both have their societies or Vereins, both local or national, and now each may

be said to have, for the first time, their distinct organ. The *Zahn-technische Reform*, Berlin, while partially under the care of the general society, was in no proper sense its organ. Whether the change of name from *Zahntechnische* to *Zahnkünstler* (literally dental artist) will add anything to the skill is questionable, nor does it seem any improvement on the old title, but, be that as it may, it is gratifying to notice the evidence of life and energy exhibited.

No greater mistake can be made than to suppose that mechanical dentistry is in any degree lower than operative. They are both equally important to the best welfare of the profession, and he who contemns the one in the expectation that he will exalt the other is guilty of a crime against the interests not only of dentistry, but of humanity at large. It is, therefore, with no ordinary satisfaction that the new aspirant for professional favor is welcomed.—J. T.

**MALARIA:** What it Means, and How Avoided. By JOSEPH F. EDWARDS, M.D. Philadelphia: Presley Blakiston, 1881.

This is another of the considerable number of books recently published intended to convey to the popular mind special and practical information on subjects connected with the preservation of health. The subject is considered in four chapters, entitled "What is Malaria," "Where is Malaria Found," "Symptoms or Signs of Malaria," and "How to Avoid Malaria."

Claiming that malaria means *bad air*, and that the most frequent cause of bad air is organic decomposition, the author points out the various sources of contamination; gives the indications of their injurious effects upon the system, and wholesome advice how to lessen or avoid the liabilities.

**THE INDEX OF PHYSIOLOGY.** By L. ASHLEY FAUGHT, D.D.S. Philadelphia: William H. Hoskins, 1881.

This is a little book of 122 pages, which aims to give a concise epitome of the salient facts of physiology. The author's preface, itself a model of conciseness, we copy entire as characterizing the object of the writer as tersely as we could hope to give it:

"The *Index of Physiology* makes no pretension as a contribution to original investigation, but has been compiled with the view of giving to the advanced student a ready and complete reference book of physiological facts, and to the novice a clear foundation for more mature study."

Each subject is treated of in a separate chapter, and the special facts connected therewith are made prominent by words in capitals scattered throughout the text to the left of the page. The author has accomplished the object set forth in the preface very satisfactorily.

## OBITUARY.

## JOSHUA TUCKER, M.D.

DR. JOSHUA TUCKER died at Winchendon, Mass., his native town, on the 7th inst. Dr. Tucker was born August 7, 1800. At the age of eighteen he left his native place, and, after the pursuit of business for several years, commenced the study of dentistry with Dr. D. C. Ambler, of Columbia, S. C., and continued his studies with Dr. C. Starr Brewster, of Charleston, meanwhile attending lectures at the South Carolina Medical College. After the completion of his studies he went to Havana, Cuba, where he continued in the practice of his profession for several years, until driven away by the yellow fever, from which he himself was a sufferer. Coming to Boston in 1833, he became associated with Dr. Daniel Harwood, and the name of Harwood & Tucker became well known, not only in New England, but throughout the country and in Europe as well. For many years Dr. Tucker was a great sufferer from facial neuralgia, and in 1853, being much impaired in health, he visited Europe. Here he remained two years, employing the best skill that the great capitals afforded, but without permanent relief. On returning home he resumed active practice, which he only relinquished some five or six years since. Coming of a long-lived and hardy race, simple and pure in his habits, he fought bravely for renewed health, and for some years past has been comparatively free from suffering, passing peacefully away after a short illness at the ripe age of eighty-one years and three months. He was peculiarly genial in temperament, and through his sufferings retained unbounded hope and faith, and looked upon the cheerful side of life. He was in all senses a lovable man, and was deeply loved and respected by all who knew him. He was a member of the Massachusetts Medical Society since 1838, and was president and an honorary member of numerous professional societies, including the Odontological Society of Great Britain.

## JOSEPH S. HARTMAN, D.D.S.

DIED, at Richmond, Va., November 7, 1881, Joseph S. Hartman, D.D.S., in the twenty-fifth year of his age.

Dr. Hartman was born in Wheeling, W. Va.; studied dentistry under his brother at Petersburg, and Dr. Harris, at Harrisonburg; was a graduate of the Baltimore Dental College of the class of 1879, after which he was associated in business with Dr. George B. Steel, of Richmond. He was a member of the Virginia State Dental Association, and was considered to be a dentist of superior talent and fine promise.



## PUBLISHERS' NOTICE.

## THE NEW VOLUME.

THIS issue completes the Twenty-third Volume of the DENTAL Cosmos. The initial number of the Twenty-fourth Volume will be published January 1, 1882.

The status of dentistry is no longer problematical. The importance of its scientific practice is universally admitted. It has won its way to honorable recognition as an eminently practical vocation, requiring knowledge, skill, and special training.

In dentistry, as in every other profession, scholastic preparation must necessarily be supplemented by systematic study of new facts and new theories, which are being constantly developed. The practitioner who neglects to read and profit by the recorded investigations and experiences of his fellows will assuredly fail of that success which he might otherwise attain.

We have labored unceasingly to make the DENTAL COSMOS invaluable to the dental practitioner. Neither pains nor expense has been spared to enhance its usefulness to the profession. How well we have succeeded our unequalled circulation bears witness. The future conduct of the journal must be inferred from its past record. Every consideration will inspire effort to at least maintain its standard, and better it if we can.

The DENTAL COSMOS is published at a price within the reach of all. We believe it to be worth more than the subscription price. We have therefore concluded to abandon the bad practice of seeking subscriptions by the offer of a premium. We earnestly desire to extend the circulation of the journal, but it must henceforth stand on its own merits.

THE S. S. WHITE DENTAL MANUFACTURING CO.

## PERISCOPE.

HEREDITARY SYPHILIS AS THE CONSTANT CAUSE OF RICKETS. By M. Parrot (Paris). The author referred to facts in favor of the frequency of hereditary syphilis. He divided the disease into two stages: active syphilis—skin-eruptions, and desquamative affections of the tongue; and past syphilis—cicatrices, and abnormalities of the teeth. He said that a study of the skeleton in these conditions showed changes in bone in the great majority of cases (98 per cent.), in common with one or more of the preceding manifestations of syphilis. He said that there were three kinds of these lesions of bone, which corresponded to the different ages of the individuals, and might succeed each other, or occur together in the same individual, or show themselves in different subjects. They were as follows, in chronological order:

<i>Epiphysis.</i>	<i>Diaphysis.</i>	<i>Consistence.</i>
1. Chondrocalcareous.	Osteophytes (hard).	Hard.
2. Gelatiniform.	" "	Moderate.
3. Chondrospongoid.	Osteophytes (spongy).	Soft.

The third kind (chondrospongoid) was identical with the bone-affection studied till now under the name of rickets. When the three kinds succeeded each other in the same subject, the insensible transition of one into the other was established. The causes which had been considered to be those of rickets could only bring on osteomalacia; now, osteomalacia was not rickets. Such alleged causes were of commonplace occurrence, and were inconsistent with each other. Insufficient nourishment was of no importance as a cause; and he maintained that very wasted and cachectic children were not rickety if not syphilitic; while, on the other hand, very fat and fine children might be rickety if syphilitic. Osteomalacia might be produced artificially, but rickets never. The affection called congenital rickets was not rickets, it was achondroplasia. An alteration so typical and methodical as rickets could not, he thought, recognize different and commonplace causes for its origin; it must and did point in all circumstances to a single specific cause; and that cause was hereditary syphilis. At the period when syphilis produced rickets, it has made its last effort. It existed no longer, but had substituted for itself a new affection. This was, he considered, an example of transformation of disease. Finally, he believed that rickets, though originated by a contagious disease, was not contagious.

Dr. Stephenson (Aberdeen) had made the clinical history of rickets the subject of special study, and the result of this study was emphatically to contradict the statement of M. Parrot, that hereditary syphilis was the constant cause of rickets. His pathological facts were very valuable, but his deductions from them were, in the speaker's opinion, erroneous. The determining element in the production of rickets was not syphilis; or bad hygiene, or any other one cause, but a "constitutional habit" (or diathesis).

M. Bouchut (Paris) held that syphilis was not a direct factor in the production of rickets, its only influence in that direction lying in the cachectic state which it produced, an influence which it shared equally with scrofulosis, anæmia, and all those chronic maladies

which interfered with a regular development, and produced a condition of malnutrition which affects, not the osseous system alone, but the whole body. The most important of the causes of this cachexia was chronic enteritis, however produced; the prolonged diarrhœa arrested development, and produced all the lesions of rickets. Again, to take the case of a child, able to walk, who was not syphilitic, and fell ill and was confined to bed for five or six weeks; when it was convalescent it would be found to have grown so feeble as to be unable to stand; the bones would be found soft and tender, and the power of walking would not be regained for two or three months. By such circumstances as these rickets was produced; and it could be produced in dogs experimentally. If one half of a litter of puppies were confined and liberally fed diarrhœa was induced, and the animals became rickety; while if the other half were properly fed and allowed to run free, they developed quite regularly. Where in this case was the influence of syphilis to be discovered? Syphilis, therefore, he thought, went for nothing in the causation of rickets; the contrary proposition was, he believed, an hypothesis which could not be justified.

Dr. Byers (Belfast) had had the opportunity of studying the question at the children's hospital at Belfast, where rickets was common, but congenital syphilis comparatively rare; and his observations there went against the view that syphilis *per se* was the cause of rickets. He found rickets present where careful inquiry into the health of the whole family elicited no history of syphilis, and he found it absent where he knew that the parents were infected, and where some of the children showed evidence of congenital syphilis. As to cranio-tabes, he believed that it was in syphilitic children that it was most often found, and that it comparatively rarely occurred in rickety children. Even if he found that syphilitic children subsequently became rickety, he would not be inclined to conclude that syphilis was the sole cause of rickets; it would be as reasonable to argue that, because some children who had measles subsequently became rickety, therefore measles was the sole cause of rickets. Mr. Jonathan Hutchinson had often pointed out that syphilis was a great simulator of other diseases; and that in congenital syphilis a general periostitis was very common, which caused a swelling of the ends of the bones and general tenderness, a condition very liable to be mistaken for rickets, with which, however, it had no real connection.

Dr. Gibert (Havre) said that he was a convert to the views of M. Parrot, but a convert *malgré lui*. It was to certain clinical facts that his conversion was due. One of these was that chronic enteritis was, he found, incapable of producing the osseous lesions of rickets; another was, that rickets could be cured by antisymphilitic remedies more quickly than by any other means; this last argument owed its weight to the adage quoted by M. Guérin—*naturam morborum ostendit curatio*. In conclusion, he asked those who believed that rickets could be produced by improper diet to produce anatomical evidence.

Dr. Ranke (Munich) said that he saw four or five thousand children a year; in this large number of children he saw many cases of rickets, but only comparatively few cases of hereditary syphilis—



the latter disease being rare among the inhabitants of Munich. A great many cases of rickets were also brought to him from the country; these children were the offspring of well-to-do peasant proprietors, among whom syphilis might be said to be scarcely known. From his observations, he had come to the conclusion that there was absolutely no etiological connection between rickets and syphilis. He did not, of course, mean to maintain that hereditary syphilis might not, in some rare cases, show a certain resemblance to rickets; Dr. Wigner had, by his able researches, shown that it might. In conclusion, he would remark that he thought it most unscientific to draw, as M. Gibert had done, any conclusion as to etiology from therapeutic observations. If M. Gibert had seen many cases of rickets recover under antisiphilitic treatment, Dr. Ranke could equally say that he had seen many cases get well without any medical treatment at all.

Dr. Robert Lee (London), after referring to the statistics of the large number of cases upon which he based his opinions, said that he believed that, when syphilis affected the bones (as it did but rarely), it produced the conditions described by M. Parrot; and that these conditions were special to syphilis, and were not what was termed rickets. He could agree with M. Parrot in the earlier part of his paper, which dealt with the osseous lesion of syphilis, but entirely disagreed with the theory by which he attributed to osteomalacia those conditions which were universally called rickets in England. There was, therefore, a difference in the meaning attached to the terms used; and, since this difference existed, it was impossible to hope for a satisfactory conclusion to the discussion.

Dr. Sansom (London) said that his observations were opposed to the idea that syphilis was a constant cause of rickets. No doubt, the two conditions were often associated; but he believed the true relation between them was, that syphilis was a cause of a general dyscrasia upon which rickets was engrafted. This dyscrasia was dependent on a variety of causes. A prime phenomenon of rickets was pyrexia; if the pyrexia were combatted by cold ablutions (with sea-water by preference), and the cases treated on sound hygienic and medical principles, the rickets became cured; antisiphilitic treatment was by no means a necessity. Though thus differing from his main conclusions, the speaker concluded by paying a high compliment to the admirable researches of M. Parrot on bone-disease in syphilis, which had done infinite good by stimulating the interest of the profession.

Dr. Norman Moore (London) said, that, when he first began to study rickets, he thought that its sole cause was improper alimentation; subsequent observation had, however, convinced him that some cases had a different etiology, and that perhaps, in some cases, syphilis might be the cause. He thought that the geographical distribution of the disease deserved attention; differences in social habit or in climate might perhaps explain how it came about that M. Parrot described, as common, a class of cases that were certainly rare in this country.

Dr. Eddison (Leeds) objected to any argument in favor of the syphilitic origin of rickets, which was based on therapeutic successes. He had been able to watch, over a long period of time,

cases which were certainly benefited by attention to details of hygiene and alimentation. In conclusion, he commented on the absence, in most cases of rickets, of all the ordinary symptoms of hereditary syphilis.

Dr. A. Jacobi (New York) said that he believed cranio-tabes was by no means a symptom of syphilis, with which the great majority of cases had no connection. Mercury was of use in dyspepsia, as an antifermentative; it was also an antiphlogistic, and its alleged efficacy in rickets did not at all prove the syphilitic nature of that disease. It had been found that the administration of mercury in small doses over a long period, tended to increase the number of blood-corpuscles, so that it might be looked upon as a tonic remedy. Syphilis might be one of the causes of rickets—one among many others. M. Parrot maintained that it was the only one, because some rickety children had congenital syphilis; it would be as reasonable to argue that mother's milk was the only cause of rickets, because some children fed exclusively at the breast became rickety.

M. Parrot said that the arguments brought against his views were chiefly directed to two points, etiology and treatment. With regard to the question of etiology, M. Gibert had already answered most of the objections; it was well known that great numbers of children whose health were greatly reduced by chronic diseases, such as enteritis, bronchitis, Pott's disease, still showed no traces of rickets, and that many rickety children were big and stout. He believed that such causes of ill health as the above led to osteomalacia, that is, to a condition in which the earthy salts partially disappeared, the Haversian canals became enlarged, and the proper firm matrix was replaced by a soft material; and that they did not lead to rickets, that is to say, they did not give rise to a condition in which the essential lesion was the production of spongoid tissue, for without that lesion there could be no rickets. It had been said that rickets could be produced in the lower animals. M. Jules Guérin had advanced this argument, and had concluded that, since these animals were not subject to syphilis, therefore, rickets could not be due to syphilis, but the experiments of M. Guérin had been repeated by M. Tripier, and by himself (M. Parrot), and they had failed to produce rickets; a certain degree of softening of the bones was produced, but not rickets. With regard to treatment, it had been said that, if rickets were due to syphilis, then it ought to be susceptible of cure by antisiphilitic treatment. M. Parrot believed that, during the first two periods of the osseous lesions of hereditary syphilis—namely, those which preceded the period of rickets—a cure might be so effected; but that rickets was, as it were, the expiring effort of syphilis, which then ceased to be, leaving, as an illustration of the transformation of disease, a new malady—rickets—in place of the old malady, syphilis. Were there not, he asked, instances of such transformations among skin diseases? He prescribed iodide of potassium for rickets, just as it was prescribed for many other pathological conditions not due to syphilis; he had often seen iodine do good in rickets, and he thought that his theory explained how this might be the case.

The President said that it had struck him that some light might be thrown on the question by an appeal to history. The first for-



mal account given of the disease was by Glisson; but there were traces of a disease affecting the young, and producing deformities like those of rickets, long before the period when syphilis was supposed to have been introduced into Europe. The question of the influence of climate, and of geographical distribution, which had been raised by Dr. Moore, was an important one. His impression was, that rickets in Paris was a less severe disease than in London. A Brazilian physician had told him that, though syphilis was common in Brazil, rickets was unknown. It would be interesting in this connection to ascertain whether rickets was frequent in the Pacific Islands, whose inhabitants had been decimated by syphilis. With reference to the symptoms relied on by M. Parrot as indicative of past syphilis, one—the condition of the tongue—he believed he had seen in isolated members of otherwise healthy families; as to cranio-tabes, he felt little hesitation in believing it to be syphilitic. As to the general manifestations of rickets, they often did not appear until the second year, and were ushered in by a general febrile disturbance, and other symptoms pointing rather to a constitutional disease than to a simple affection of the osseous system. One other point was, that the deformities produced by rickets were always attended by an arrest of development; this was not noticed in children evidently syphilitic, and the arrest of development did not affect the whole skeleton alike, for while the long bones and the pelvis were dwarfed, the vertebral column was not shortened. Lastly, there was the possibility of producing rickets in animals, as proved by the experiments of Guérin, Rolt, Voigt, and others. For all these reasons, he could but express his conclusion as to the propositions brought forward by M. Parrot by the Scotch verdict—Not Proven.—*Discussion before International Medical Congress, British Medical Journal.*

NOTES ON THE PATHOLOGY OF RICKETS.—1. The clinical experience, that congenital rickets is met with, that the majority of children born with congenital syphilis become rickety even under the best nursing, that rickets arise as a sequelæ of grave febrile disease, and of grave chronic gastro-intestinal disorder, that it arises in consequence of bad nourishment and want of fresh air, the further experience that rickets is associated with considerable troubles in the nervous system (larygismus stridulus, hydrocephalus, hypertrophy of the brain), all combine to exclude, from a clinical point of view, the possibility of explaining the disease by a simple deficiency of the inorganic constituents of the bone.

2. The opinion that rickets consists only in a deficiency of the lime is also excluded by the fact that the proportions between the inorganic and the organic (minus fat) constituents of the bone are so considerably altered—160:100 instead of the normal 563:100—that supposing the lime is eliminated from the food of the child for a whole year, the proportion would by a proximate estimate be found to be still 513:100.

3. In a certain opposition to these clinical experiences are the experimental studies of some authors (principally Roloff in Berlin), who have proved that rickets may be produced in animals by withdrawing lime from the food.



I have repeated these experiments, and found :

a. Simple elimination of lime from the food produces, in fact, considerable changes in the bone.

b. The change appears macroscopically and microscopically about the same as a slight rickety change.

c. The degree of change produced is, as it is shown by anatomical, and principally by chemical, examination, only a mild one.

4. If, besides the elimination of lime from the food, lactic acid is added to the latter, the alterations are considerably increased. This is shown :

a. By the macroscopical and microscopical examination of the bone.

b. Especially by the chemical test.

5. The considerable influence which the addition of the lactic acid has in connection with the elimination of lime from the food proves that withdrawing of the lime alone cannot be the determining cause.

6. In fact, both factors, the elimination of lime and the addition of lactic acid, have this in common, that they produce an alteration in the general nutrition—the one by withholding an indispensable constituent of the organism, the other by introducing a substance apt to disturb the digestion.

7. The lesion of the bones is only the most prominent feature, because the disturbance of the general nutrition happens in a time when the growth of the bone is most active.

8. Further, is it possible to prove that neutral solutions of peptons have the faculty of dissolving lime?

9. This faculty of the peptons shows how in children suffering from an alteration in the composition of the blood in consequence of faulty nourishment, lime combination may be dissolved in the growing and ossifying bone, and carried away from it.

10. The elimination of the carried off lime combinations takes place through the intestinal canal, as can be shown by the examination of motions from rickety children.

11. Rickets is, therefore, a dyscrasia originated by an alteration in the general nutrition which may be caused by various noxious influences working upon the infantile organism.

12. In accordance with this view are the well-known successful therapeutic results of such remedies which are suited to improve general nutrition, especially good hygienic conditions, normal nourishment, the use of baths, and tonic medicines.—*Adolph Baginsky, before the International Medical Congress, Medical Press.*

**THE ETIOLOGY OF GANGRENE OF THE MOUTH (Noma).—**Dr. Krasine (*La France Médicale*, 1881, p. 657; from *Vratchebniya Vaidomosti*) gives the case of two persons—a mother and daughter, aged respectively 48 and 8 years—who, following the endurance of great hardship, were attacked with gangrene of the face. Examined in the hospital two weeks after the beginning of the disease, for which neither treatment nor attention had been previously obtained, the greater part of the right cheek was found in both cases to have been destroyed by gangrene. The patients died after a fortnight's stay in the hospital, the disease having run a course of a month, which

is rare in fatal cases. Krasine, in reporting the cases, discusses the pathogeny of noma in general. It is rarely found in adults,—usually in children of ten or twelve years, following eruptive and intermittent fevers. Its occurrence is favored by bad alimentation, damp dwellings, and the abuse of mercury (?—Ed.). It is more frequent among girls than among boys.

Noma generally begins by the appearance of a patch of induration situated on the mucous surface of the cheek near the labial commissure, and which is quickly surrounded by minute phlyctenulæ. The neighboring parts swell, the patch becomes black, it spreads on the surface and deeply, the soft tissues become involved, and even the bone is affected. After the removal of the sphacelated portions a hideous hole remains in the side of the cheek. Death occurs in seventy cases out of one hundred. In case of cure, extreme disfigurement, with adherent cicatrices, is apt to ensue.

The disease has sometimes been considered to originate in some disorder of the nervous system, particularly the vaso-motors of the face. Krasine, however, is inclined to think that it is due to a cutting off of the blood supply in an anæmic and broken-down person by the exercise of pressure.

This pressure may in some cases be the result of lying on one side or the other during a prolonged illness, and is thus nothing more than a gangrene from decubitus.

Noma is generally limited to one side of the face; it rarely attacks the other side. Above, it may reach to the free border of the under eyelid and to the ear. It rarely passes beyond the border of the lower jaw. The tongue and the eye of the affected side remain untouched. Noma attacks children because, in Krasine's opinion, the amount of blood in the body is relatively smaller than in adults, nutrition changes are active, and anæmia is quickly produced and has grave consequences. Why the disease should attack little girls by preference is as yet inexplicable.

The treatment of noma has hitherto been by means of local remedies, caustics, the cautery, etc. Krasine, however, speaking from his point of view of the origin of the disease, urges improved nutrition, tonics, stimulants, etc., with simple antiseptic dressing.—*Cincinnati Lancet and Clinic.*

**CHRONIC SUPPURATION CONNECTED WITH THE TEETH.**—Mr. David Hepburn read a paper on "Chronic Suppuration Connected with the Teeth."—After briefly referring to the most common form, that of ordinary alveolar abscess, in which a fistulous opening existed on the surface of the gum communicating by a short canal with the root of a tooth, Mr. Hepburn proceeded to describe those more complicated cases in which the pus had penetrated to a part remote from the original source of the mischief. Of this he related several instances which had come under his own observation, as where an impacted wisdom tooth had given rise to a large abscess which opened in the neck. In most cases the extraction of the tooth, which had been the original cause of the mischief, would be followed by the closure of the sinuses; but it was not always easy to discover which tooth was the cause of the mischief, and sometimes when this had been extracted, little improvement would result. This was generally due

to the presence of some small portion of necrosed bone, but this again was often most difficult to discover, and might remain for months keeping up irritation. Mr. Hepburn related several cases illustrating these points. In one the patient was under treatment for five months, and was eventually cured by the extraction of an upper lateral incisor. In another the patient had been suffering for seven months from a profuse discharge of offensive pus coming from the socket of an extracted lateral. Active treatment was persisted in for eight months, when suspicion fell upon the central incisors; these were extracted, and at the bottom of the socket of the right central a piece of dead bone was found and a canal which had communicated in a circuitous manner with the sinus which had been so long discharging; immediate improvement followed. Mr. Hepburn spoke highly of the value of eucalyptus oil in these cases; it was a powerful antiseptic and a useful stimulant, and was altogether far preferable to carbolic acid for this purpose. Tincture of iodine was also useful, but the great point was to find out and remove the cause of the irritation as soon as possible. An interesting discussion followed.—*Rep. Odont. Soc. of Great Britain, in Med. Press and Circ.*

**A NEW AND ORIGINAL METHOD OF TREATING EXPOSED PULPS.**—Every educated member of the profession will agree with me when I say that the preservation of exposed pulps is a most important operation, and one the results of which, up to the present, are far from what they might be. I have lately been experimenting upon an entirely original method for their preservation, with very gratifying results. The procedure is as follows:

Procure a piece of clean metal (that used for working celluloid will do very well), about No. 6 in thickness, and cut a square piece the size of the bottom of the cavity to be operated in; in the center of this cut a small hole large enough to receive a platinum tube (one taken from a tube tooth answers admirably); insert the tube in the center, and soft-solder together: the cap may be bent slightly convex. This is then placed at the bottom of the cavity, directly over the exposed pulp, resting on the dentine, and is fixed there by "fossiline," and completely covered with the same (I am here speaking of the cap only)—and, as far as oxychlorides go, up to the present I consider fossiline the best. This effectually holds the cap in position, and when once set, it is difficult to move. We can then fill with whatever material we consider suitable. If gold, a piece of pin wire, with a round head, kept for the purpose, should be inserted in the tube to protect it from being compressed during consolidation. We have thus a very direct and certain means of treating the pulp. Apply a small crystal of carbolic acid through the tube, and then close it by inserting a small screw with a rounded head. It is understood that a thread must be cut in the tube about one-sixteenth of an inch in length to effectually secure the screw, and thus completely seal the tube. The tube must be carefully adjusted evenly with the masticating surface, and with regard to the articulation of the antagonizing teeth. For the treatment of alveolar abscess, suppuration, etc., I believe it bids fair to become a very successful operation. We can thus treat the tooth mechanically at once, and leave the surgical treatment to be entirely independent.



The screw can be removed by patients if necessary. We can treat a pulp with much less difficulty and trouble, and the annoyance of having to remove and insert fresh dressings, and seal up with mastic, etc., is entirely avoided. Further, we are saved the uncertainty of any pressure resulting from a freshly-inserted dressing, and thus irritating the pulp. I have performed this operation seventeen times, and in every case with success, and can assuredly say that the beneficial results were brought about in a much shorter time than by the previous method of dressings on wool, etc. When the treatment is complete, the screw is removed and substituted by gold foil or hickory wood (the latter I have not yet tried). I shall be glad if some members of the profession (careful operators) will test this operation and make known their experiences.—*William Victor Ditcham, in the Dental Record.*

**DRY DRESSINGS WITH POWDERED SALICYLIC ACID.**—The good results obtained in the treatment of ulcers, wounds, etc., by the application of powdered iodoform, have led to a similar series of experiments with powdered salicylic acid at the surgical clinic of Erlangen. The method, as described by Schmid, is very simple. The wound is first carefully cleansed and disinfected with a five per cent. solution of carbolic acid. Where practicable, sutures are applied and the closed wound covered with a layer of very finely pulverized salicylic acid, one-half centimeter high and sufficiently extensive to overlie the wound one centimeter in every direction. Excavated wounds, after being cleansed, are carefully plugged with acid, and then likewise powdered, and the whole protected by a piece of antiseptic gauze or salicylated cotton. Wounds thus treated secrete only a small amount of wound-serum, which coalesces with the dressing so as to form an adherent crust. No smell of decomposition manifests itself; on the contrary, several wounds of long standing were thoroughly deodorized by this method, after ordinary Listerian dressings had been ineffectually employed. At the same time the temperature of the patient, if elevated, sinks as much as 2° C. or more. As the dressing appears to promote a luxuriant growth of granulations, it is more applicable to excavated than to surface wounds.—*New York Medical Record.*

**ANTISEPTIC TREATMENT OF ABSCESS.**—Dr. Lucas-Championnière recommends the following procedure: Before opening an abscess, in whatever region it may be placed, we should carefully wash the skin, especially if it has been covered by a poultice, with a strong carbolic acid solution (crystals, 50 parts; glycerin, 50 to 75 parts; and water, 1000 parts). The bistoury should also be dipped in the solution. The contents of the abscess are to be discharged, and some of the above solution injected, care being taken that the injected liquid has a free issue. The end of a caoutchouc tube is introduced into the wound, having a thread attached to it to facilitate its removal, and it is then covered by a thick layer of charpie, impregnated with a solution of carbolic acid, 25 parts; glycerin, 25 parts; and water, 1000 parts. Finally, over all is laid a layer of gummed silk. At the end of twenty-four hours the tube is removed in order that it may be cleansed and shortened, when it is again

covered with the charpie, moistened with the weaker solution. Under this treatment the amount of suppuration is diminished, the redness of the wound becomes insignificant, and the cicatrices which result are much less apparent. Dr. Lucas recommends this procedure especially in abscess of the breast.—*Med. Times and Gazette, from Union Medicale.*

TO TERMINATE THE CHLOROFORM NARCOSIS.—A peculiar device is mentioned by Schirmer in the February number of the *Centralblatt f. Augenheilkunde*. He claims to have used it in his clinic for many years, and often succeeded in producing inspiratory movements when other means failed. He also employed it to induce rapid recovery; for instance, in strabismus operations, in order to test the result. The method consists in irritating the nasal mucous membrane. It has long been known, at least to physiologists, that the fifth nerve retains its sensibility longer than any other part in narcosis, and that reflexes may be induced through this nerve when other irritations fail. Schirmer uses simply a rolled piece of paper, which he turns in the nose. In dangerous cases he dips the paper into ammonia.—*Medical Press.*

OPERATION FOR THE CLOSURE OF SMALL ORIFICES IN THE PALATE.—The following case, in which a small orifice in the palate leading into the antrum was readily closed, and with very little pain or discomfort to the patient, may be of interest to your readers.

A female, aged fifty-three, applied at the dental hospital on account of an opening into the antrum of oval form, about one-third of an inch in the long and one-eighth of an inch in the short diameter, the result of an exfoliation of bone following the removal of a first upper molar tooth. Bearing in mind the plan suggested by my friend, Mr. F. Mason, for effecting the closure of such openings by the repeated application of nitric acid, I determined to try the effect of the actual cautery, as, in my opinion, less likely to cause loss of tissue than the acid. To this end I employed the thermal cautery at a black heat, or rather, I should say, directly the redness had disappeared. The effect was to cause a little blistering all around the orifice. The process was repeated three times at a period of a fortnight between each, and the orifice is now perfectly closed.—*Alfred Coleman, in the Lancet.*

BROMIDE OF POTASSIUM IN INFANTILE DENTITION.—M. Peyraud (*Journal de Thérapeutique*, 10 Juin, 1880) recommends this drug for relief to the painful and troublesome processes of infantile dentition, and employs the following prescription:

R.—Bromide of Potassium, 2-3 grammes.  
Honey, 15-20 grammes.  
Water, q. s.

After the solution has taken place, heat and evaporate to a consistency of honey, adding alcohol to preserve the mixture. By rubbing this upon inflamed gums the mucous membrane is attacked and denuded, the hyperæmic circulation is diminished, the inflammation reduced, and the projecting points of the teeth will gradually pierce the gum, and the contemporaneous inflammation of the mouth will be subdued.

The internal use of this drug will likewise, in the author's ex-

perience, prevent or abate the convulsions incidental to teething infants. He also recommends the use of the bromide in dental caries, which it arrests, and acts as a substitute for the arsenical preparations commonly used by dentists. Into a little cyst of the eyelid M. Peyraud injected subcutaneously a strong solution of the bromide, which was followed by the complete disappearance of the cystic tumor.—*Boston Medical and Surgical Journal*.

**HÆMOSTATIC PILLS.**—Dr. Huchard often prescribes the following pills in various forms of hemorrhage, as metrorrhagia,\* epistaxis, and hæmoptysis.

R.—Ergotine, sulphate of quinine, of each, 2 grammes ;

Powder of digitalis, extract of hyoseyamus, of each, 20 centigrammes.

To be divided into twenty pills. From five to eight or ten to be taken in a day. In this very complete formula the ergotine and sulphate of quinine act on the contractility of the vessels, the digitalis on the circulation, and hyoseyamus on the irritation and pain.—*Medical Press and Circular*.

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## HINTS AND QUERIES.

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"He that questioneth much shall learn much."—BACON.

CORRESPONDENTS desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

WHAT is the best treatment for teeth worn down by mastication so as to be unpleasantly sensitive, and yet not in a condition to be "shod?"—F. J. W.

WILL some one inform me how to remove the tarter from the roots of teeth where it has penetrated the sockets beyond the reach of the ordinary instruments? I have a case of the two inferior centrals affected in this manner, and am at a loss to know how to treat them successfully.—J. K.

IN the November number of the DENTAL COSMOS I am recorded as advising T. K. to "drill the tooth on the labial surface." Of course it is apparent to any reader that that was a mistake. It should have read drill the tooth on the *lingual* surface.—LOUIS OTTOFY, D.D.S.

IN reply to the protest of J. F. F., in the November number of the DENTAL COSMOS, against my use of the expression, "In proportion as teeth need saving," etc., I should like to ask, What teeth do need saving? It is not altogether transparent to me, as it seems to be to him, that teeth "need saving" in the inverse ratio of their value.

I take it that teeth "need saving" according to their worth, as determined by their structure, the probability of future integrity and usefulness, with freedom from pain and annoyance on the part of their possessor. I am free to admit that the case he supposes—"a tooth of *wretchedly* poor structure, an *immense* cavity of decay, in a *dreadfully* inaccessible position"—constitutes a dreadful state of affairs as regards the tooth; that it is also slightly unfortunate for the owner. To the wayfaring man it does not look as if such a tooth could give



promise of a very brilliant future. Were I the unhappy owner of it, I should not think it needed "saving" very badly. On the other hand, were I the possessor of such a tooth as he first describes—one with "dense structure," with a small cavity of decay"—I should say *that* needed saving, or, to put it more sensibly, that *I should need it saved*.

I do not know how anything very valuable can be built anywhere without a foundation sufficient to support what is put upon it. The very best that can be expected, in the case of such a tooth as the bad one described, is to give it a short lease of life with the probability of an early decease and burial, and I doubt if there are twenty dentists in the United States who would undertake to build it up with anything other than plastic material of some sort. It is not a case that needs argument or that anybody wants to argue. The point I wish to make is that the expression, "In proportion as teeth need saving," etc., is an ill-chosen one for the purpose of those who use it; it is a kind of meaningless generality that has not even the merit of glittering.

The foundations for our work in tooth-building come to us ready made, good, bad, and indifferent; we have to take them as they come, and build upon them, using whatever material or combination of materials seems best adapted to the base presented. Different substances have each their merits, and there is no occasion for a quarrel with any, least of all with the old king of metals.—G. NEWKIRK, M.D.

W., in the October number of the DENTAL COSMOS, asks, "What are the causes which produce grinding of the teeth during sleep, and what should be the treatment?"

Grinding of the teeth during sleep is a symptom met with in persons of a gouty diathesis.

Tanner says that there is "an irresistible desire to grind the teeth. Sometimes the teeth are worn down to the sockets, the uneasy sensation in them being only alleviated by forcibly grinding them together. (Tanner's *Practice of Medicine*, page 126.)

In Trousseau's *Clinical Medicine*, Vol. IV., page 362, we find, "Gnashing of the teeth is a premonitory symptom which I only found mentioned by Graves. The celebrated clinical professor of Dublin says that the patients have an irrepressible desire to grind their teeth, and that this is excited by painful sensations in the urinary organs which they fancy cannot be otherwise appeased. The urgency of the desire to grind the teeth is so great in some gouty persons that at last their teeth become worn down to the sockets."

Flint, in his *Practice of Medicine*, page, 938, says: "This habit was marked in a gouty person under my observation."

Thinking these extracts would be of interest to the readers of the COSMOS, even if of no practical use to W., I beg leave to offer them.—GEO. L. PARMELE, M.D., D.M.D.

RETENTION OF DECIDUOUS TEETH.—In answer to M. A., in the November number of the DENTAL COSMOS, I would reply that from my experience it would be poor practice to extract sound, healthy deciduous molars at that age, merely because they were deciduous, and when *nothing else* indicated such treatment.

I presume M. A. intends to say the *second* instead of the *first* deciduous molars, as it would be hardly likely that the *first* bicuspid would replace the *second* deciduous molars. I meet with many such cases as M. A. refers to. Sometimes only one or two of the molars are retained, and frequently three and four. I

know of two sisters, over forty years of age, who have each their four deciduous second molars, and every one perfectly sound and healthy.—STORMONT.

**METALLIC-CAP FILLING.**—The position of the dental profession of to-day, as regards filling teeth, may be said to form an interrogation point. It is standing in an attitude of expectation, scanning the horizon for the arrival of the ideal filling. Metals expand and contract and let in moisture, or else they discolor and look offensive; the mineral pastes are friable externally and irritative internally; gutta-percha is most excellent internally, but too soft for outward use; neither is the ideal filling, and perhaps in the present state of dentistry there is no better practice than to combine the three, while we await the advent of that filling which will neither contract nor discolor, neither wear under mastication nor dissolve in oral fluids, of the color of tooth-substance, and as compatible with the pulp.

In the meantime it is well for us, with Laertes, to "hear each man's counsel." In offering mine, I shall define that particular mode of using in combination the three materials already mentioned which appeals to my understanding as the most appropriate in a large number of cases.

As metals contract from all points towards a center, it is evident that a metallic plug, in contraction, is not only drawn away from the side-walls of a cavity, but also from its floor and mouth, *and that this latter is in proportion to the length of the plug.* The "metallic cap" admits only the minimum of contraction in this direction.

In excavating a cavity for gold filling, it has been customary to cut away a large area of firm enamel when overhanging subjacent decay. While this may be good practice when it eradicates suspicious-looking fissures, yet in numberless cases it bears the character of accommodation of the royal metal, and unquestionably increases the contraction of the plug at the orifice, thus admitting the moisture which we are told converts our filled tooth into an electric battery, and which undoubtedly does increase the conductivity of the dentine, and thus tends to endanger the pulp. The metallic-cap manner of filling does not demand so great a sacrifice of enamel, and thus admits less shrinkage across the orifice.

The gist of the operation being advocated is simply this: Fill the bulk of the cavity to the inner edge of the enamel with some non-conducting material, and cap this with metal held in by a slight overhanging of the enamel walls.

I proceed in about this manner: When excavating the chamber, I avoid cutting the orifice as wide as the body of the cavity, and, by holding a fissure-burr at an angle of about ten degrees with the axis of the cavity, level away the enamel inwards on two opposing sides (this is to retain the metallic cap); then level *outwards*, very slightly, the sharp and ragged edge of enamel to insure against its chipping off under the mallet, and to permit that firm compaction of gold, when used adhesive, which an upward-inclined surface favors; then burnish the excised enamel; dry with heated air, and disinfect with carbolic acid diluted with alcohol; varnish with sandarac varnish sold at the depots, diluting it first with about fifty per cent. of alcohol. Place gutta-percha over the floor of the cavity, if it be large or the pulp in danger of irritation. I use a solution of the gum from which the chloroform has been permitted to evaporate, until the result is a material but little softer than ordinary cheese. In this condition it packs easily, and does not cling to the instrument or mouth of the cavity; it also hardens sufficiently almost immediately. This substratum being laid, the next step is to employ a material which will adhere so tenaciously to the dentine as to prevent the intervention of moisture. The mineral pastes present themselves. Using the phosphates of alu-

minum and zinc, I compress it firmly into the cavity until the lower edge of the enamel is reached—not merely lining the chamber, but filling it (almost)—so that should the metallic part come away, at any future period, the sub-filling is in a much better condition to remain firm than if the cavity were merely lined. If the enamel is thin, and it is desired to give a concave contour to the cap when finished, it is well to sink a slight concavity in the cement, so as to give the desired strength to the metallic cap. In a few minutes a cap of any metal may be put on. If amalgam be employed, I use it cold, condensing with the mallet, and scrupulously avoid over-filling the cavity, scooping away the mercury which rises to the surface; then, with a piece of spunk held in the foil-carrier, pat and press the surface until it is smooth, level with the orifice, and contoured according to the adjoining contour of tooth; avoiding, as much as possible, any angle at the union of the tooth and filling—such angle not only rendering burnishing difficult, but offering hospitality to the enemy.

The advantages of this course may be expressed thus:

The minimum contraction of a metallic filling is reached.

The minimum conductivity of a filling, when employing metal at its surface, is approximated.

Moisture is excluded from the dentine.

Discoloration of the tooth is obviated.

Bruising of the dentine by the mallet is avoided.—STEWART J. SPENCE, *North San Juan, Cal.*

DISCOVERIES, INVENTIONS, ETC., IN DENTAL PRACTICE.—1000 B.C. The Greek physician, Esculapius the third, is said to have practiced extraction.

In the Temple of Delphi a leaden instrument was preserved which was used for the extraction of teeth. It was called odontagogos, i.e., tooth-extractor, and it is believed, without proof, however, that it was a forceps. Extraction, and probably also the replacing of lost teeth, must have been known to the Egyptians as early as 2000 B.C., for the extraction of a front tooth constituted with them a disgraceful punishment, but there are no particulars extant.

460 B.C. Hippocrates, a celebrated Greek physician, furnished the first observation on diseases of the teeth, etc.

32 B.C. Celsus, a Roman physician, used the root-forceps, which bore the Greek name "rhizagra;" although, according to this, it would seem not to have been invented by Celsus, but by some Greek physician.

A.D. 60. Andromachus, a Roman physician, invented theriac for fillings, a mixture supposed to possess great healing properties. Subsequently theriac was considered the great panacea, and while now confined almost entirely to veterinary surgery, was then made with great solemnity in the open market-place of Venice.

890. Rhazes and Ebn Sina, Arabian physicians, made use of white arsenic, but the death of the pulp, through arsenical applications, does not appear to have been known to them. The only aim seems to have been to procure a painless decay for the tooth, and this result was probably only obtained where pulpitis existed.

1460. Montagnana, an Italian physician, was the first to make use of sulphate of zinc.

1560. Ryff, a German physician, invented the "pelican." Ryff also wrote a valuable work on surgery, especially that of the teeth.

1563. Andre Vesalius, a celebrated physician, born at Brussels, was the first



to practice scarification of the gum, which he did on himself in order to facilitate the eruption of a wisdom tooth.

1569. Ambrosius Paré, a French physician, first discussed and practiced transplanting teeth, and made, besides, artificial plates of gold and silver.

1602. Pet. Forest is said to have invented the elevator (*geisfuss*).

1617. Fabricius ab Aquapendente, an Italian physician, recommends cleaning the teeth, and furnished a description of caries.

1622. Hemard, a French dentist, manufactured ivory teeth.

1630. John Arculanus, an Italian physician, described and inserted gold fillings.

1633. Dupont, a French dentist, recommended implantation.

1650. Nathaniel Highmore, a celebrated English physician, furnished a description of the cavity of the superior maxilla, which has been named after him *antrum Highmorianum*.

1674. Nicholas Pulpius, a native of Holland, recommended the tamponade after extraction.

1678. The celebrated naturalist, Lieuwenhock, of Holland, discovered the tubuli of dentine.

1690. Purrmann, a surgeon of Breslau, took impressions in wax.

1720. Fauchard, a French dentist and productive author, discovered the first rational method of regulating.

1735. Discovery of caoutchouc, in Cayenne, by members of the French Academy.

1756. The first description of plaster model, by Pfaff, mechanical dentist to Frederick the Great.

1774. Dubois de Chémant invented artificial teeth of porcelain. He constructed a full set of this material, the entire upper and under set being prepared from one piece. He named the material "incorruptible mineral paste." The credit of the invention was disputed by an apothecary named Duchateau, and so effectively that the credit of the discovery is shared equally by both. Chémant, however, received the patent, and must, therefore, be credited with the invention.

1776. Priestly discovered nitrous oxide gas.

1780. Charles de Lecluse, called Clusius, a French physician, constructed the hebel (lever) for the extraction of teeth.

1795. Pearson discovered the anesthetic property of ether.

1807. Humphrey Davy discovered the anesthetic property of nitrous oxide gas.

1808. Fonzi, a French dentist, constructed single enameled teeth to be eventually arranged together in an entire set. He did great service in the improvement of enameled teeth.

1835. Spooner introduced arsenic for the destruction of the pulp.

1841. John Tomes constructed his superior forceps, which are now generally in use.

1844. Horace Wells introduced nitrous oxide into the practice of dentistry. As no one gave the gas credit for anesthetic properties, he found many opponents, and, as he failed to produce narcosis before a medical association, his claim was ridiculed, and he declared a charlatan. In spite of this, Wells continued its use without securing the recognition he deserved. He committed suicide in 1848, while laboring under mental aberration.

1845. Dr. Montgomery, an English doctor connected with the English Colonial government at Singapore, discovered gutta-percha.

1846. Morton introduced ether as an anesthetic into dental practice.

1847. Simpson introduced chloroform.

1848. Dr. Evans, dentist to Napoleon III., made the first set of teeth on rubber.  
 1850. Hill prepared his gutta-percha (Hill's stopping) for filling teeth.  
 1850. Delabarre recommended the use of gutta-percha for artificial plates.  
 1853. Watt first introduced his sponge gold for filling teeth.  
 1869. Hyatt invented Celluloid.—*Translated for the DENTAL COSMOS, by H. J. T., from the "Vierteljahrsschrift des Vereins deutscher Zahnkünstler."*

NEW YORK, October 9, 1881.

TO THE EDITOR OF THE DENTAL COSMOS:

I thank you for the review of "Horses' Teeth," by "C. N. P.," in the April number of the DENTAL COSMOS, and for the suggestions it contains. However, I regret to say that the writer must have given the work a superficial reading, for otherwise he could not have made the following groundless charge:

"The chapter on the permanent dentition, containing as it does much valuable information, would have been more complete had the discrepancy which exists between the number of permanent teeth, which is given as forty (40), and the number belonging to the ancestral horse forty-four (44), been explained by the statement that the first premolar is rudimentary in the horse, and hence lost early, though kept long enough to show the relation his dentition has to the typical mammalian number, and also illustrating in this change from forty-four to forty an interesting transitional feature."

The chapter on "The Permanent Dentition" is devoted to the consideration of the functionally developed teeth only, and a foot-note informs the reader that the unfunctionally developed teeth are treated of in the chapter entitled "Remnant Teeth." To disprove another charge by your reviewer, namely, that "the book is wholly a compilation," allow me to make an extract from the latter chapter, as follows:

"The remnant, or so-called wolf-teeth, are one of the most interesting features of the horse's dental system. They are generally regarded as phenomena, but their line of descent is as direct as that of the first premolars (grinders), which have, as it were, almost absorbed them, and have increased in bulk nearly in proportion to the decrease in bulk of the remnant teeth.

"As the word 'wolf' is another name for that which is hurtful or destructive, and as these teeth, as well as supernumerary teeth (with which, however, they should never be confounded), sometimes do injury, the generic name 'wolf-teeth' is not a bad one. But, since these particular teeth are hereditary, being beyond doubt the remains of teeth that were once functionally developed, they require a specific name; I have therefore adopted REMNANT TEETH.

"During the evolution of the horse from the animal of about the size of a fox to his present proportions, it is not strange that radical physical changes of the teeth, as well as other organs, should have occurred, etc.

"That remnant teeth are usually regarded as phenomena is abundantly proved by some of the extracts that follow. In Johnson's *New Universal Cyclopaedia* (p. 995), article 'Horse,' it is said:

"An additional small tooth is occasionally found in advance of the upper molar series. This tooth, when present, is the smallest of all the teeth, and, as it has neither predecessor nor successor, its nature is in doubt."

The above extracts are specimens of the chapter on "Remnant Teeth." I may be mistaken, but I believe the chapter explains the "nature" of these teeth. And yet, according to C. N. P., "the book is wholly a compilation!"

Respectfully yours,

W. H. CLARKE.

